THIS MAY NOT BE
PHOTOCOPIED
USE MICROFICHE FOR COPIES

volume 6

* 4090.273

OMNIVM LVX CIVIVM
MDCCCLII
MDCCC LXXVIII

BOSTON
PUBLIC
LIBRARY

1896 - 1897

NA1
.A6

VI. No. 1. *For Quarter ending September 30, 1896.*

THE ARCHITECTURAL RECORD.

NOV 7 1896

CONTENTS

OPTICAL REFINEMENTS IN MEDIÆVAL ARCHITECTURE.
WM. H. GOODYEAR.

FRENCH CATHEDRALS.
BARR FERREE.

MODERN HOSPITALS IN EUROPE.
ALPHONSE DE CALONNE

DR. WILLIAM THORNTON, ARCHITECT.
GLENN BROWN.

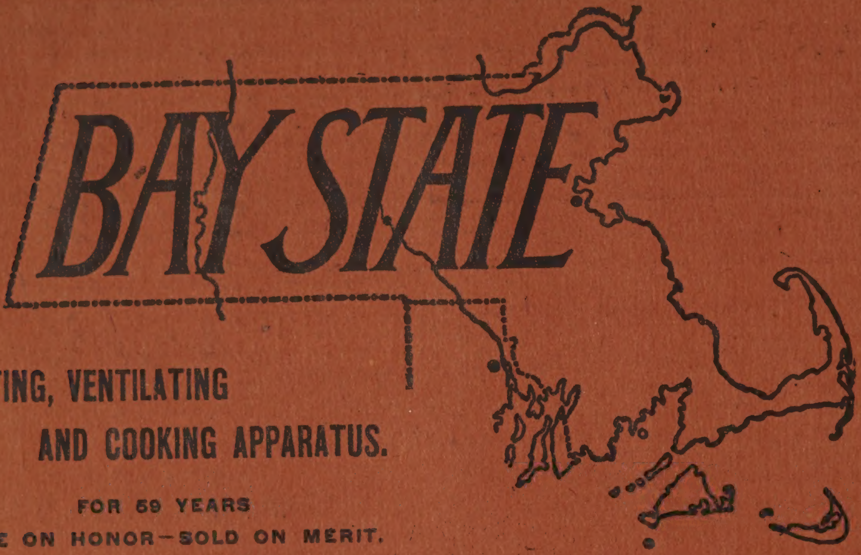
AUTHORITY IN ARCHITECTURAL DESIGN.
JOHN BEVERLEY ROBINSON.

ARCHITECTURAL ABERRATIONS. No. 15.

BOOK REVIEWS.
RUSSELL STURGIS.

50 ILLUSTRATIONS.

THE ARCHITECTURAL RECORD CO., 14-16 VESEY STREET, N. Y.
PRICE, TWENTY-FIVE CENTS.



HEATING, VENTILATING
AND COOKING APPARATUS.

FOR 59 YEARS
MADE ON HONOR—SOLD ON MERIT.

BARSTOW STOVE CO.,

NEW YORK OFFICE:
Beekman and Water Streets.

FOUNDRIES:
Providence, R. I.

BOSTON OFFICE:
56 Union Street.

DAILY REPORTS on all Building Operations in New York City and vicinity, Boston and New England, can be obtained from Record and Guide Building Information Department, 14-16 Vesey Street, New York City, for **14 CENTS A DAY.** Write for particulars.

THE

ARCHITECTURAL RECORD

PUBLISHED QUARTERLY
WITH ILLUSTRATIONS

VOLUME VI

JULY, 1896....JUNE, 1897

PUBLISHED BY
THE ARCHITECTURAL RECORD CO.
14-16 VESEY ST., N. Y. CITY

4190.273

CONTENTS

OF

THE ARCHITECTURAL RECORD.

Volume VI.

July, 1896—June 1897.

		PAGE
Architectural Aberrations, No. 15		77
Authority in Architectural Design	John Beverley Robinson	71, 557
A Flemish Painter's Art Treasures	A. J. Wauters	439
A Discovery of Horizontal Curves in Medieval Italian Architecture	Wm. H. Goodyear	481
Book Reviews		87, 233, 407
Considerations on Painting	Russell Sturgis	220
Constructive Asymmetry in Medieval Italian Churches	Wm. H. Goodyear	376
Corner House in Paris	P. Frantz Marcou	310
Chippendale Furniture	Alvan C. Nye	429
Dr. William Thornton, Architect	Glenn Brown	53
Decorative Windows in England and America	Russell Sturgis	509
Early Renaissance in France	G. A. T. Middleton	126
Electric Lighting of Modern Office Buildings	Wm. S. Monroe, M. E.	105
European Architecture	Russell Sturgis	407
French Cathedrals. Parts VII., VIII., IX.	Barr Ferree	21, 145, 323
French Cathedrals. Part X.	Barr Ferree	469
Household Furnishings	Helen Campbell	97
Modern Decoration	Jean Schopter	243
Modern Hospitals in Europe	Alphonse de Calonne	29
Modern Vault Construction	John Beverley Robinson	447
Optical Refinements in Medieval Architecture	Wm. H. Goodyear	1
Perspective Illusions in Medieval Italian Churches	Wm. H. Goodyear	163
Sculpture as Applied to the External Decoration of Paris Houses	Fernand Mazade	134
Sicily, The Garden of the Mediterranean	Albert M. Whitman	289
Smaller Houses of the English Suburbs and Provinces	Banister Fletcher, F. R. I. B. A.	114
Villas of Rome	Marcus T. Reynolds	256
Works of R. H. Robertson	Montgomery Schuyler	184
Works of Henry Janeway Hardenbergh	Montgomery Schuyler	335
Works of Cady, Berg & See	Montgomery Schuyler	557
Wooden Houses in Switzerland	Jean Schopfer	415

SPRAGUE

Electric Elevator Company

POSTAL TELEGRAPH BUILDING, NEW YORK,

BUILDERS OF

ELECTRIC PASSENGER AND FREIGHT ELEVATORS

The Multiple-Sheave Screw Machine

Duplicates Hydraulic Service with less than half the water evaporation and coal expenditure. It has any required speed and capacity. Each machine is an independent unit. Like parts are interchangeable. It has a superior down start. It occupies less space. It is absolutely safe.

The Worm-Gear Drum Machine

Is for all classes of intermediate service. It is the most perfect machine of its type built.

The Automatic House Elevator

Is absolutely safe. It requires no operator.

Recent contracts include five of the finest and most costly buildings of their respective classes ever projected: Manhattan Hotel, New York City, nine elevators; Siegel-Cooper Stores, New York City, twenty-one elevators; Commercial Cable Building, New York City, twenty-one stories; Mr. John Jacob Astor's New Palatial Hotel, New York City, nineteen elevators; Mutual Benefit Insurance Co. Building, 60 State Street, Boston.

Among typical buildings adopting Sprague Machines, are:

Postal Telegraph Building	New York City
Syndicate Building	“ “
Gerken Building	“ “
Custom House	“ “
J. T. Williams Office Build'gs.	“ “
Young Men's Christian Ass'n.	“ “
Daniells' Stores	“ “
Edison Electric Illum't'g Co.	“ “
Ahrens Building	“ “
Wadsworth Building	“ “
Residence of Mr. John J. Astor.	“ “
Residence of Mr. Geo. Morgan.	“ “
Graham Building	“ “
Board of Trade	Chicago
Hotel Walton	Philadelphia
Boston Daily Globe	Boston
Mutual Benefit Insurance Co.	“
Parrott Building	San Francisco
Safe Deposit Building	San Francisco
Academy of Music	“
Government Printing Office, War Department	Washington
Merchants' National Bank	Baltimore
Johns Hopkins University	“
Guarantee Building	Buffalo
Union Trust Building	Detroit
Mabley Building	“
The Callender, McAuslan & Troup Co.'s Department Stores	Providence
State Mutual Life Assurance Co.	Worcester
Court House and City Hall	Minneapolis
City and County Court House	Salt Lake City
Currier Bank Building	Los Angeles
Wilcox Building	“
Canada Life Insurance Co.	Montreal

ARCHITECTS...

THROUGHOUT THE COUNTRY ARE
ACQUAINTED WITH OUR PRODUCT

WE OFFER THE ONLY
COMPLETE SYSTEM OF
ELECTRIC WIRING
IN EXISTENCE . . . .

THE BROAD, FUNDAMENTAL PATENTS COVERING OUR PROCESS OF MANUFACTURE, GIVE EXCLUSIVE STRENGTH AND INTEGRITY TO THE INSULATION POSSESSED BY OUR NEW STANDARD IRON-ARMORED INSULATING . . . CONDUIT

ILLUSTRATED CATALOGUES, FULL PARTICULARS AND SAMPLES UPON APPLICATION . . . .

INTERIOR CONDUIT AND
INSULATION COMPANY...

GENERAL OFFICES AND WORKS,
527 West 34th Street, New York.

WESTINGHOUSE, CHURCH, KERR & CO.

Engineers.

GENERAL MECHANICAL ENGINEERING . . . AND CONTRACTING . . .

Involving the use of the best apparatus in every line adapted in size and economy to best meet the practical requirements of all classes of service.

Complete engineering plants installed under one contract for everything required by a modern building with one responsibility for the entire service and the proper working together of all related apparatus.

We design our plants with our own engineering force, and with full appreciation of architectural requirements and limitations.

We do our own work with our own men and not by sub-contracting.

We own, or control, special apparatus in various lines, much of which is patented, and use it when it fits, but without prejudice to the use of anything else that may be better suited to any requirements.

We make specialties of simple and compound steam engines of five kinds, of all sizes and for every purpose; gas engines that regulate and run economically; complete steam plants for the most economical generation of steam; mechanical stokers and smokeless furnaces for saving labor and fuel; economizers and mechanical draft plants saving waste heat and making good draft; complete electric plants, for electric light, power and elevator service; refrigerating plants of all sizes and for all purposes; block and plate ice plants making "Diamond Ice"; steam loops for draining steam pipes, saving coal and preventing accidents.

All of the above being only means to ends, the ends being the chief consideration.

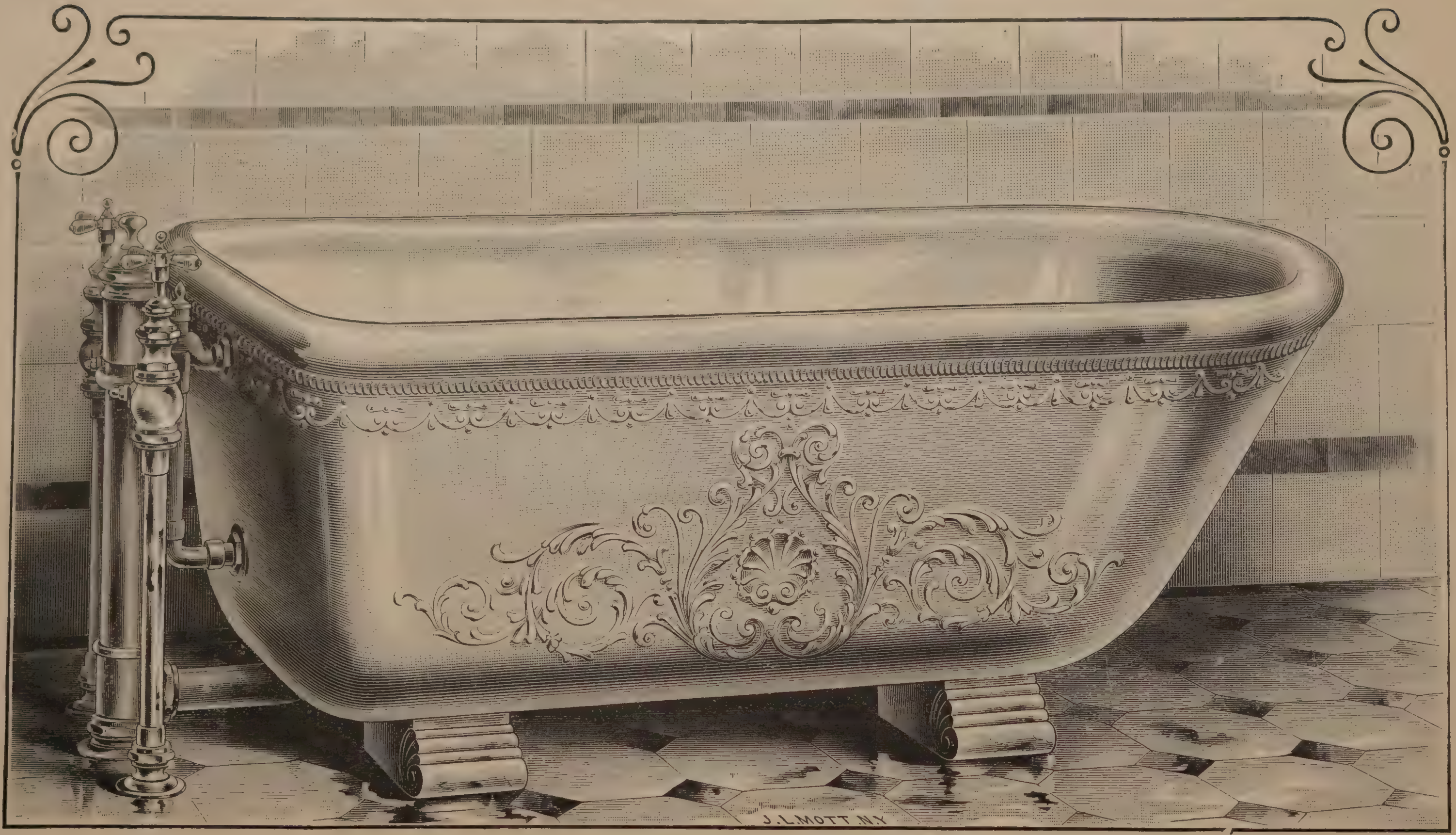
NEW YORK,
26 Cortlandt Street.

BOSTON,
53 State Street.

PITTSBURG,
Westinghouse Building.

CHICAGO,
171 LaSalle Street.

The J. L. MOTT IRON WORKS,
NEW YORK, BOSTON, CHICAGO, ST. LOUIS, AND SAN FRANCISCO.



"IMPERIAL" PORCELAIN ROLL-RIM BATH. Plate 1087-G. Copyright 1893.
With Supply Fittings, Pipes to floor, Patent Unique Waste and Marble Legs. The Bath, as shown, nas Glazed Rim and is Embossed outside in Ivory and Gold (Linspar process); it can also be embossed in Ivory and Gold and Turquoise, or any other tint to order.

ST. PAUL BUILDING,	George B. Post, Architect
HAVEMEYER BUILDING,	George B. Post, Architect
EQUITABLE BUILDING,	George B. Post, Architect
WELD ESTATE BUILDING,	George B. Post, Architect
COE ESTATE BUILDING,	George B. Post, Architect
SHERRY BUILDING,	McKim, Mead & White, Architects
NEW YORK LIFE INS. BUILDING,	McKim, Mead & White, Architects
TOWNSEND BUILDING,	Cyrus L. W. Eidlitz, Architect
FIDELITY AND CASUALTY BUILDING,	Cyrus L. W. Eidlitz, Architect

ATLAS **Portland Cement**

GUARANTEED TO BE SUPERIOR
TO ANY IMPORTED CEMENT.....

ATLAS CEMENT CO.

143 Liberty Street, New York.

GILLENDER BUILDING,	Berg & Clark, Architects
HARTFORD FIRE INS. BUILDING,	Cady, Berg & See, Architects
AMERICAN SURETY BUILDING,	Bruce Price, Architect
STANDARD OIL BUILDING,	Kimball & Thompson, Architects
JOHNSTON BUILDING,	J. B. Baker, Architect
PRESBYTERIAN BUILDING,	J. B. Baker, Architect
BANK OF COMMERCE,	J. B. Baker, Architect
MILLS' MODEL TENEMENT HOUSES,	Ernest Flagg, Architect
SCRIBNER BUILDING,	Ernest Flagg, Architect

NEW YORK CENTRAL R.R. BRIDGE OVER HARLEM RIVER.

Richey, Browne & Donald.

Borden and Review Avs.
Long Island City,
N. Y.

ARTISTIC BRONZE BRASS & IRON WORK
HAMMERED ORNAMENTAL WROUGHT LEAFWORK
STAIRS
ELEVATOR FRONTS
& CARS
GRILLES
LAMPS
RAILINGS
GATES
WINDOW GUARDS
BANK RAILINGS
E.T.C.
STAIR RAIL FOR MRS. E.F. SHEPARD'S RESIDENCE
McKIM MEAD & WHITE ARCHTS.
LAMP FOR BROADWAY POWER HOUSE
PORTE-COCHÈRE FOR MRS. E.F. SHEPARD'S RESIDENCE
C.W.

CONSERVATORY FOR E.T. GERRY ESQ.

RICHARD M. HUNT. ARCHITECT.

ARCHITECTS DESIGNS FAITHFULLY EXECUTED

SPECIAL DESIGNS FURNISHED IF DESIRED

The
Architectural Record.

VOL. VI. JULY-SEPTEMBER, 1896. NO. 1.

OPTICAL REFINEMENTS IN MEDIÆVAL ARCHITECTURE.*

Report of the Brooklyn Institute Survey, May–October, 1895.

I.

ADMIRATION of the mediæval cathedrals is so much a matter of course nowadays that all persons inside the pale of European civilization are expected to feel it and to give expression to it, consequently they all do it. How far this admiration is a matter of fashion and how far it is really felt is, however, an open question. Historic associations and the romance connected with them will carry people a long way in Westminster or at Canterbury. The mediæval cathedrals are, generally, larger buildings than their modern copies, and in so far are calculated to excite admiration by this fact of their dimension, which is, of all elements in building, the most obvious and the most easily understood. It is, however, extremely doubtful whether the finest qualities of the mediæval cathedrals are those which generally excite the warmest admiration. Otherwise it would be extremely difficult to understand why the deficiency of these qualities is so complacently tolerated in modern buildings at once by architects and by the general public.

When Viollet le Duc said "Our streets are deserts for thought; they have all the monotony of the desert without its compensating loneliness," he was thinking of the coldness of their strict symmetry, the monotony of their mathematical regularity and of their mechanically repeated and mechanically executed details.

Our modern architectural crime, which cries aloud to heaven for reprobation, is deficiency of the picturesque. An old barn or an old farm house are a thousand times more interesting than the New York Post Office and a thousand times more interesting than a good many other buildings which it is not quite so fashionable to sneer at. This deficiency of the picturesque is largely an inevitable result of our social conditions, but that is no reason

---

*The photographs used in illustration were taken by Mr. John W. McKecknie, under direction of Professor Goodyear, for the Brooklyn Institute, expressly to illustrate the subject and are its property. The plans, sections and drawings have been prepared by Mr. John W. McKecknie, under Professor Goodyear's direction, from surveys supported by the Brooklyn Institute.

Copyright, 1896, by THE ARCHITECTURAL RECORD COMPANY. All rights reserved

why it should not be recognized and deplored.

In an old cathedral every capital, every gargoyle, every finial, every window, every statue, was an independent creative effort of the individual artisan. The designs were not passed over to the workman from an architect's office. The workman himself created the design.

Hence the infinite variety of mediæval detail which is one grand source of the picturesque character of mediæval building. Variety was an inevitable result when every workman did his own designing in detail, from the mere fact that many different workmen were employed; and the individual workman varied his own detail from one form to the next corresponding one for the same reason that he was himself the inventor of it.

Hence creations like the façades of San Martino, at Lucca, or of San Pietro, at Toscanella, to name two examples out of hundreds, are practically impossible things in modern art. Our façades are designed by an architect, not only as a whole, but also as regards their individual parts. Even where the effort occasionally appears in modern work, to manufacture artificial irregularity in the original design, this manufactured irregularity will never have the spontaneous and unpremeditated variety of the old creation. Generally speaking, even the effort is wanting. Given the effort, we still have to meet the difficulty that the stone-cutter, who works after the pattern which has been manufactured for him and not by him, will never give his cutting the sparkle, the force and the originality which distinguish the handiwork of the artist artisan of the Middle Ages. We have an analogous case in the contrast between the inferiority of our modern marble statues, which are rarely cut by the sculptor himself, and those more vital ones of older art, on which the sculptor himself did the cutting.

It appears, when these facts are examined, that the admitted inferiorities of modern architecture are largely inevitable results of changed social conditions, and that preaching and criticism are ineffective weapons against them. To change our whole social fabric and to abolish the division of labor, which has separated the architect from the master-mason, which has separated the designing clerk in a pent-up office from the stone-cutter on his scaffold—this is the impossible task which the critic must set himself, who wishes to revive the virtues of mediæval building. It is a fact of deep significance that William Morris is a Socialist, that the works of Ruskin are brimful of economic theories. Let these theories be good or bad, wise or foolish, the fact will stand that every true artist of our day is also at heart a social reformer, and it may be that he knows it best who says the least about it.

But there are other differences between a mediæval cathedral and a modern church, besides the differences in the matter of picturesque details. How rarely do we find any exact symmetry in those apparently corresponding parts which belong to the design of the mediæval church as a whole. How frequently do we find variety in the design of two corresponding spires and other irregularities of arrangement. Uniformity, even in the main features of an old cathedral, is rather an exception than a rule.

It is the habit to explain such irregularities as the result of construction at different periods. But this habit of explanation really begs the question as to how they have arisen. A cathedral was frequently two or three centuries in building, it is true, but it is absurd to say that the façade of Dinan or the choir of Mainz (before the recent restoration) showed Gothic pointed work on top of Romanesque simply for this reason. If the sentiment asking for uniformity had existed, could not the later architects have finished the building in the style prevailing when the building was begun? Admitting that one spire of the façade at Tours is later than the other, as it naturally might be, is that any reason why the second spire should not correspond to the first, if the desire had existed to make it correspond?

The fact is simply this, that the

habits of successive architects corresponded to the habit of any one given architect, and that any given architect of the Middle Age habitually introduced any variation into his design which was suggested either by his fancy or by changes of plan made for some definite cause. If, for instance, he had finished one spire and had a chance to improve the design of its fellow, either because more money and more work on it were available, or because he discovered a defect which might be avoided, or an improvement which might be added, there was nothing in the ethics of his profession or in the prejudices of his time which would antagonize such changes.

To understand an old cathedral we must begin with the union in one person of the artist and the artisan. The picturesque variety springing from the creative capacity of the individual mason and the individual stone-cutter ran all through the building. The architect himself was simply a master-mason, *i. e.*, he was himself a mason by profession. He was not isolated in an office, he was at once architect and builder. It is well known that the first man in Europe who ever proposed to separate the profession of architect and builder was the Florentine Leon Battista Alberti (fifteenth century). The first man in England who ever compelled his wood workers and stone workers to copy *his* designs, for detail, and to give up making their own, was Inigo Jones (seventeenth century).

As long as the architect was the master-mason he was not bound by his own plan. He carried his plan in his head, and on the scaffolds of his building he changed it at will and freely, as he went along.

Therefore, in its whole plan, and also in its details, an old cathedral differs from a modern church as hand-made lace differs from machine work, as a Hindoo rug differs from one made in Yonkers, as a camel's hair shawl differs from a Paisley.

II.

Up to date the element of picturesque irregularity in mediæval architecture has been most potently emphasized and most eloquently described by Mr. Ruskin, especially under the heading of the *Lamp of Life* in the *Seven Lamps of Architecture.*

He has attributed it to a conscious purpose in some definite cases, which he has specifically described, while freely admitting that there is no hard and fast line to be drawn in the examples he has cited between artistic and praiseworthy work, which achieves the element of "life," or of the picturesque, simply because it has not set up a mistaken standard of mathematical regularity—and that work which was consciously and definitely planned to avoid the coldness of strict symmetry.

There is, therefore, an element of irregularity often found in mediæval building which corresponds very closely to the style of decorative design in modern Japanese art—as regards the philosophy of the irregular quality. Clearly the artistic spirit of the Japanese decorative art consciously scorns the trammels of mathematical symmetry, but it would be difficult to say, in a multitude of cases, whether the decorative design is purposely irregular or whether it is so simply because the more difficult and yet inadvisable methods of applying mathematical measurements to decoration are not practiced in Japan.

It is rather difficult for the average taste of modern European and United States civilization to realize the interpenetration of the conscious and the unconscious factors in a really picturesque style, because this modern taste is an extremely vitiated one; judged from the standpoint of the expert in Oriental ornament or in historic design; as regards its preference for mathematical regularity in ornament or its easy toleration of the cold and formal results of such regularity. Many of our most elaborate and pretentious imitations of historic style are ridiculous caricatures of the historic monuments, when the deficiency of the vital element which makes the historic monument interesting, is considered. This vital element has a twofold character—bold contemp for strict symmetry as regards the whole organism of the building, combined with the inevitable and natural results of leaving individual details to the individual artisan. These last results, of course, can only be imagined as existing in social conditions which made of the artisan an artist having a creative capacity which to-day he has wholly lost.

The century in which division of labor has lowered the capacity of the artisan class, in which machine-made work has accustomed the eye to inartistic uniformity of ornamental detail, in which the specializing of professions and occupations has made it difficult for the educated public as a mass to be thoroughly familiar with even the most elementary canons of artistic taste, in which the habit of slavishly copying old historic styles has crippled original design in architecture, is not very well prepared to appreciate the vitality of mediæval architecture at its full value.

It is, moreover, a point of supreme importance as regards the inherent prejudices and deficiencies, both of uninstructed and also of presumably cultivated modern taste that our architectural traditions, as a matter of strict historic continuity, are those of the late Renaissance in which this vital element and the picturesque quality were wholly lacking. None of the various reactions against these traditions of the cold and formal late Renaissance date back of the last quarter of the eighteenth century. All of these reactions have been artificial revivals of older historic styles; consequently also of a necessarily formal character. How utterly, the modern Greek temple copies, for example, have been wanting in all the most interesting traits of the historic originals has been laid bare by the discoveries of Pennethorne and Penrose, whose first publication is as recent as 1851.

I cannot, therefore, feel it advisable to announce my own discoveries regarding the architecture of the Middle Age without this preliminary effort to clear the way for such announcements. The appreciation of the importance of the observations which I am about to publish will come from persons of artistic temperament already appreciative of the picturesque quality in mediæval building, and especially from those already predisposed to credit the artist *of any period* with knowing fairly well *what* he is doing and *how* he is doing it.

That the artist, in any field of art, pays very much attention to the *why* of his doing I consider rather doubtful, and in so far as my readers prefer my facts to my explanations of them or to the assumption that these explanations represent any definite theories of the builders themselves I shall be well pleased. I believe that every artist works largely from intuition, from feeling, and *from experience.* But if it be assumed that I have attempted to read into some works of the Middle Ages a subtlety and a knowledge of which their builders were naturally incapable, this is an assumption which I should indignantly resent, not on my own account but on theirs.

It is an untenable attitude which exalts or concedes the beauties of the façades at Toscanella as equal to any work in Italy, and which then attempts to explain the ground plans, which I shall publish, as being oblique because the architects did not know a rectangle when they saw it, and as having curves because they did not know how to make a straight line. To say that the interior arches of these churches are of irregular size (in dimensions, which make oversight of the fact impossible,) because the designers were barbarians or careless workmen is to say that the façades are beautiful for the same reason, which is absurd.

All I demand is that the unfamiliar but beautiful buildings which I have examined, such as the Cathedral of Troja, shall be considered as wholes and as works of inspiration throughout, and that the new facts which I shall present for buildings already familiar and already admired shall be understood as having *always* contributed to the beauties *which have been already conceded to exist.* If certain facts about them have been hitherto overlooked, let us not make the mistake of separating these facts from the effects to which they are the main contributors, of despising or neglecting the study of unknown phenomena *because they are unknown*. A ground plan is not in itself a thing of beauty, sections of churches are not in themselves interesting, measurements are not easy reading, photographic details are not the buildings themselves, but if the results which they represent are an inspiration of picturesque beauty in the given buildings, let us admit that the subject is worth looking into.

III.

I do not lay claim to any originality of presentation or any discovery of facts as to the points so far discussed regarding mediæval irregularities of construction. They have been abundantly and eloquently presented by Mr. Ruskin, especially in his *Seven Lamps*, and especially in the *Lamp of Life*. They are ideas which are certainly felt by every true artist in some way or other, and which may be half-heartedly professed by other men, whose every stroke of work gives the lie to such profession.

As distinct from the mediæval irregularities so far considered there are other phenomena of construction which have so far escaped the attention of science and of the History of Art; phenomena which constantly escape our notice when we are in the buildings; phenomena which were meant not to be seen or noticed, or not to be obtrusive.

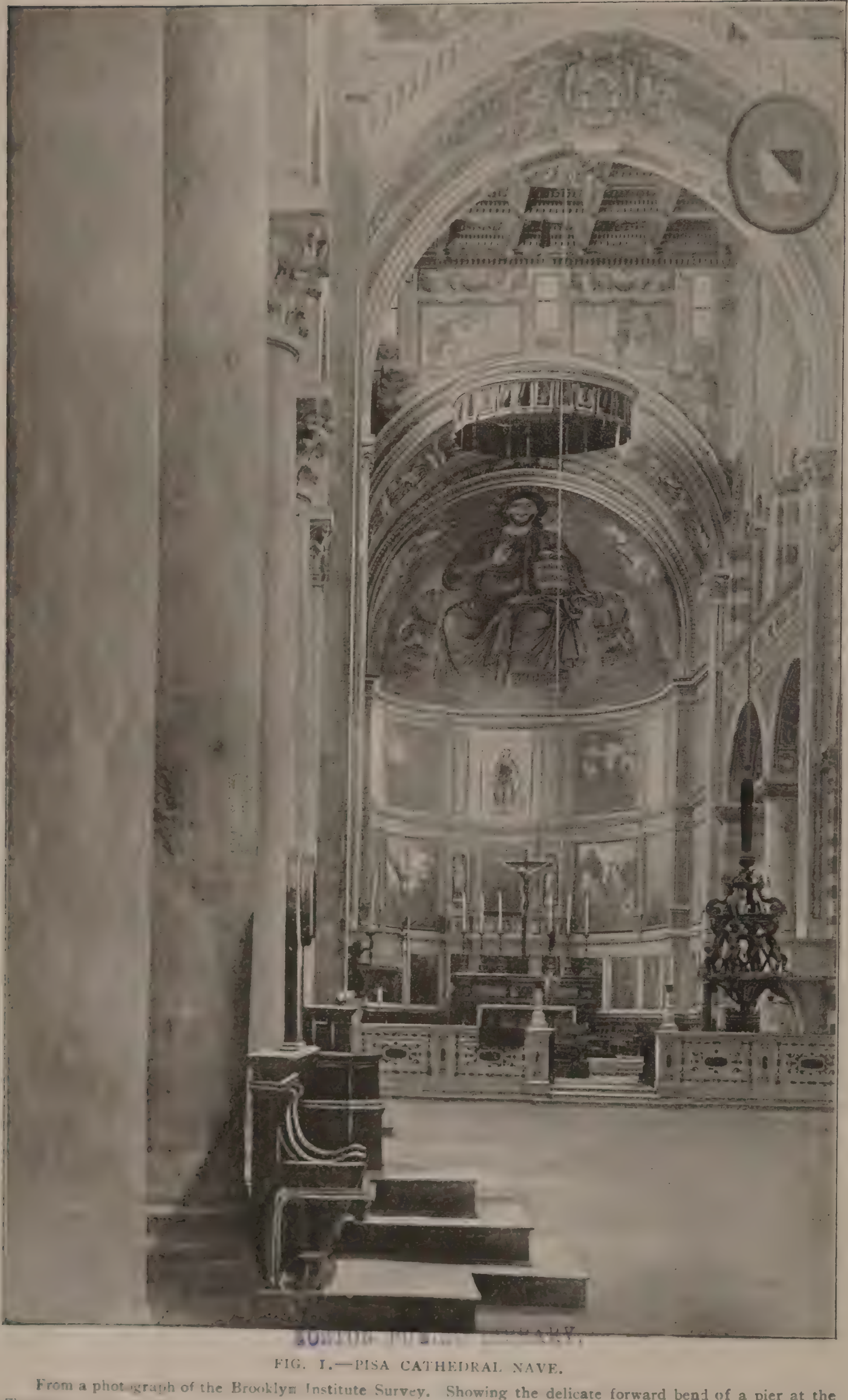
There are still other phenomena which have been seen and misinterpreted, which have been attributed to accident when there was no accident, which have been attributed to careless designing when the purpose was subtle, or which have been considered as local mysteries when they have analogies all over Europe.

These phenomena are by no means universal. For the amount of diffusion, for the localities in which they appear most frequently, for the buildings in which they exist or do not exist, I am at present only able to speak definitely, as regards one country in Europe. As far as six months' time would allow me I have made a complete survey and examination of all the mediæval buildings in Italy. This country is, however, undoubtedly the one from which the given phenomena have spread, as far as Northern Europe is concerned, and therefore the one in which a systematic study of them should be first attempted. They are largely or prominently of Byzantine origin.

Among these phenomena I will specify the following:

(*a*) The construction of the piers and vaulting of many mediæval churches in a delicate curve, sometimes leaning into the nave, sometimes bending back from the nave, and in either case making a delicate transition return curve to the arch of the vaulting (Fig. 1). There are no publications extant known to me which specify this feature in mediæval buildings. It easily escapes the eye, even when the observer is familiar with the fact and prepared to recognize it. The minimum amount of this deflection is about three inches, which means very delicate masonry adjustment. When noticed by modern architects it has, as far as I am aware, been referred by them to thrust of the aisle vault against the side of the piers supporting the nave vault or arch. I have naturally prepared myself with the evidence on this head before announcing this feature as a refinement in construction, and will mention here as one instance the case of the Cathedral of Vicenza, where there are no side aisles and where the curving piers face solid chapel walls over 20 feet deep. The curving pier is frequently met in North European cathedrals.

(*b*) A refinement analogous to the last and probably the original and earlier form of it. *It is nothing more or less than the survival of the classic entasis* in the Middle Ages, and is found in the engaged half-columns which occasionally face the Romanesque pier. There are good cases in the Cathedral of Fiesole, and in San Miniato, at Florence. The announcement of the classic entasis as existing



BOSTON PUBLIC LIBRARY.

FIG. I.—PISA CATHEDRAL NAVE.

From a photograph of the Brooklyn Institute Survey. Showing the delicate forward bend of a pier at the Transept. A plumb-line suspended from the gallery shows a deflection of 3¼ inches from the true perpendicular. See text for question of thrust.

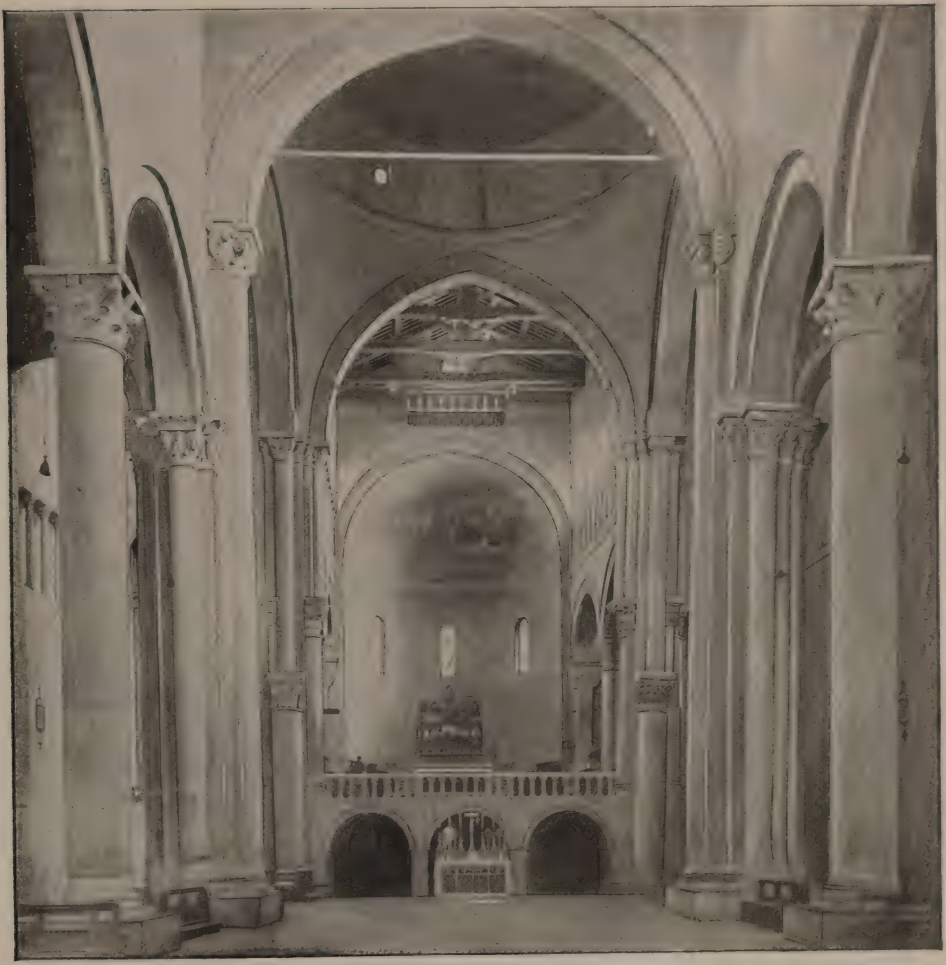
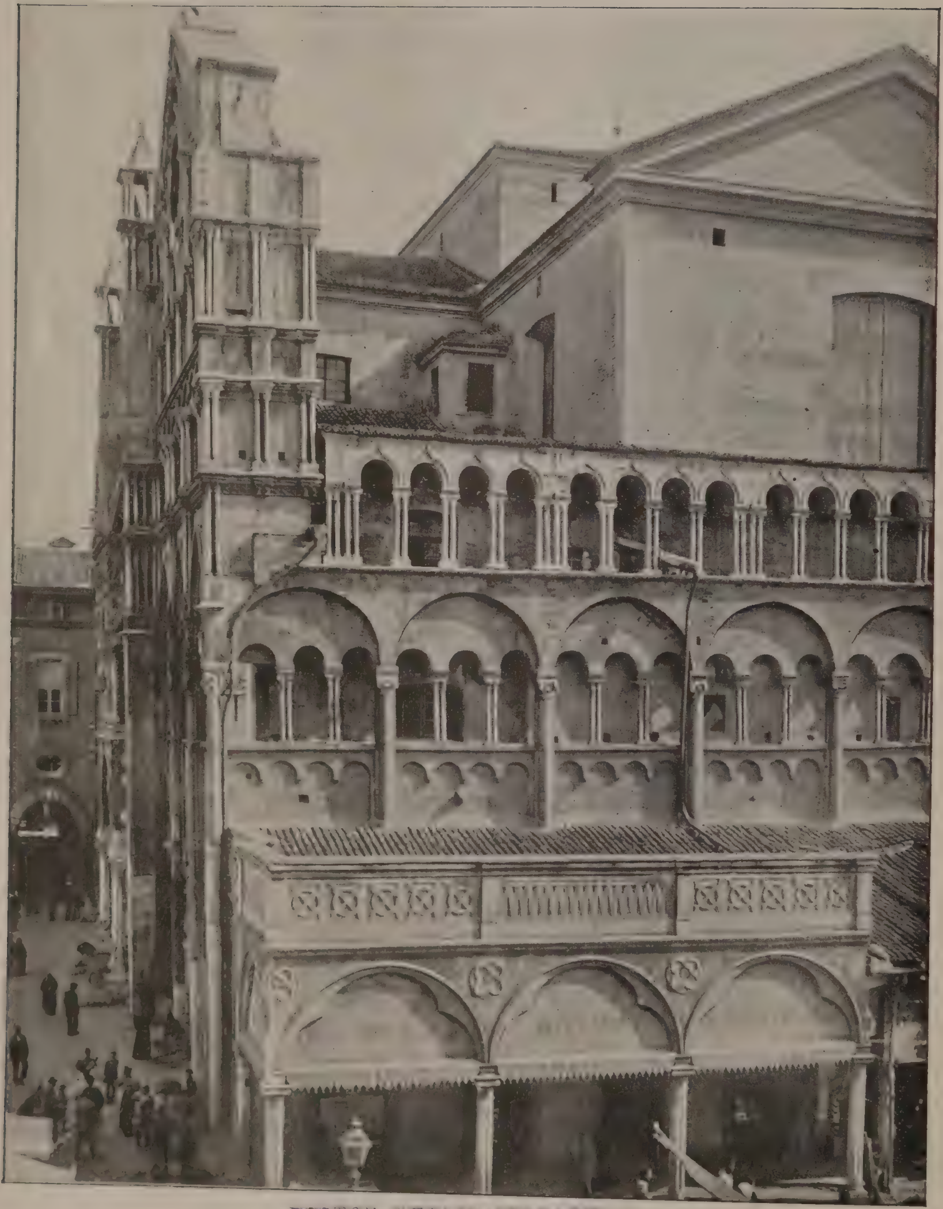


FIG. 2.—SANTA MARIA DELLA PIEVE AT AREZZO.

From a photograph of the Brooklyn Institute Survey. Showing an outward lean or spread of the piers in a delicate curve.

in the Middle Ages has been received with surprise and incredulity by certain gentlemen supposed to be experts, to whom I had made the fact known before collecting the evidence now in hand. I shall therefore assume the fact not to be generally known. I will simply add that I was taken last summer to see a case of the mediæval entasis in San Giacomo, at Florence, by Prof. Giglioli, Director of the Natural History Museum of that city. Probably, therefore, I have not imagined it. (See Fig. 11.)

(*c*) A refinement possibly or probably derived from (*a*) and frequently connected with it; a leaning outward and away from the nave of the nave piers, in phases grading from an exaggeration of the backward bend and continuing the curve, to others in which the leaning backward or spread of the piers is in a straight line and not in a curve. This feature has been erroneously ascribed to thrust of the arch or vaulting by architects to whom I have mentioned it. There is a good case at Trani of this lean against the lines of transept walls thirty or forty feet deep. There are other cases of this lean



BOSTON PUBLIC LIBRARY.

FIG. 3.—FAÇADE OF THE CATHEDRAL OF FERRARA.

Photograped by the Brooklyn Institute Survey to show the lean.

against solid ancient chapel walls, to which the pier is a facing, in San Eustorgio and in San Ambrogio, at Milan, and in San Francesco, at Pavia. It also occurs in St Mark's, at Venice, and at Santa Maria della Pieve, at Arezzo (Fig. 2), under conditions which make a theory of thrust impossible. In the latter church the outward leans amount to about fourteen inches deflection in a given pier, making a spread of over two feet in the upper nave at the springing of the arch. They are recognized as facts of construction by the local experts, who are not, however, aware of the existence of this spread elsewhere. They are known at Arezzo simply as a local mystery without analogies. There are other cases where thrust cannot be even suggested (by one who has examined the masonry), and I do not know of any case where thrust can be proven or indicated except in the unfinished part of the Siena Cathedral where an original curve has been exaggerated by a thrust, due to non-completion of the building. Cases can be shown in St. Mark's, at Venice, where the leans in the exterior vestibule and within the church are in opposing directions in one and the same wall, showing thrust to be impossible.

(*d*) A system of bends in vertical lines in the exteriors of façades and choirs, differing from some of the interior pier bends in the fact that the lower part of the bend is *always* a forward lean toward the eye facing the wall, and never, as often in the case of the interior piers, a backward lean beginning at the base (as regards the eye of a spectator in the nave facing the pier). The maximum cases of the forward lean are about fifteen inches. There is a fine instance in the Pisa Cathedral façade erroneously ascribed by Ruskin in the *Seven Lamps* to settlement. A number of corroborative cases have been carefully examined for indications of accident (Fig. 3.)

The considerations regarding a settlement of the Pisa façade will be gone into at length. I first announced this lean to be a fact of construction in 1874. The measurements in detail of 1895, taken up to and above the first cornice, are conclusive as to masonry construction. These measurements compel the assumption of a double settlement, if any took place, one sideways and one forwards, and when the theory of a double settlement is applied to the façade cornice the levels taken by Mr. McKecknie show that the façade must have settled laterally *in opposite directions at one and the same time.* The difficulties of the sceptic who asserts settlement for the

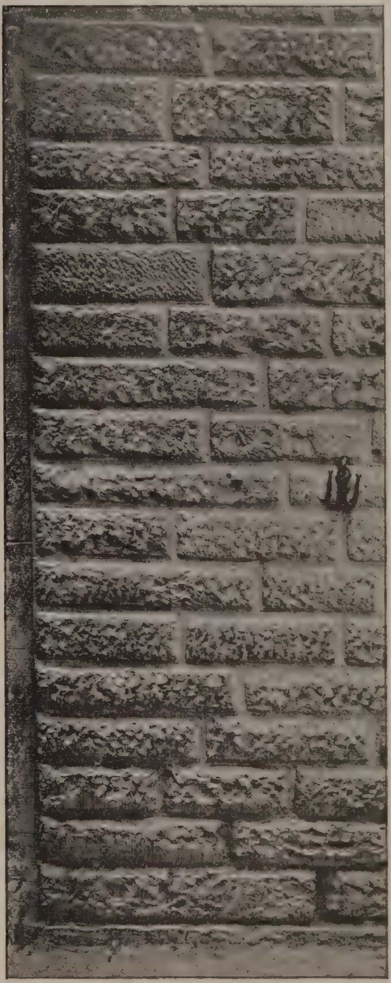


FIG. 4.—MASONRY OF THE BARCELLO TOWER, FLORENCE.

Showing a constructed lean. Photographed by the Brooklyn Institute Survey.

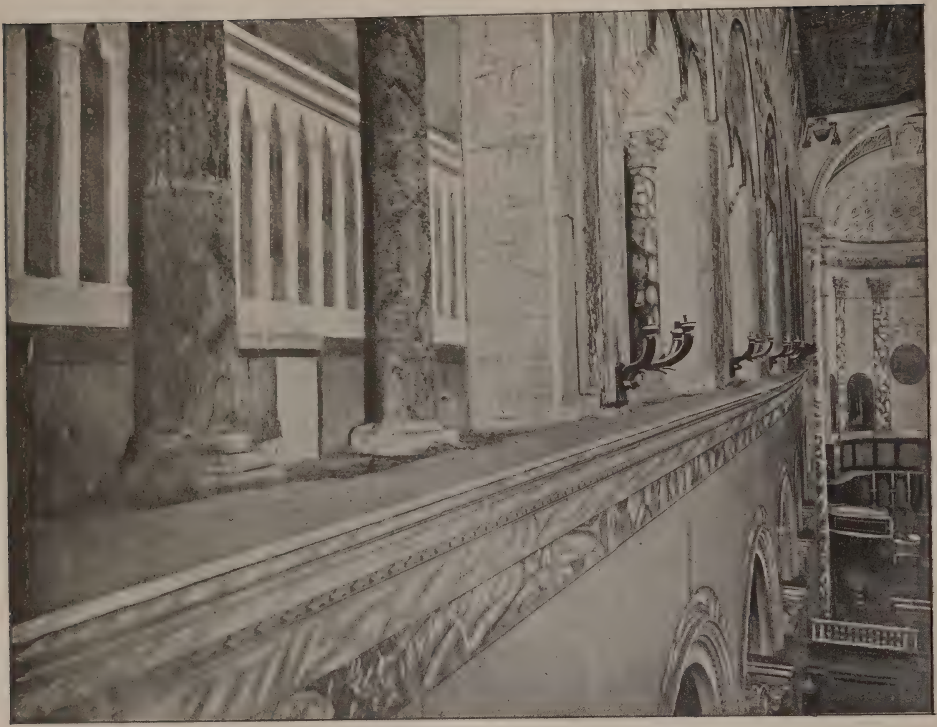


FIG. 5.—THE CURVE AT TRANI.

It extends down to the supporting columns and their bases, showing thrust to be impossible. Photographed by the Brooklyn Institute Survey.

Pisa façade are destined in the future to be somewhat amusing.

The survey of the south wall, near the angle of the façade, compels one theory of settlement for the stripes of the masonry, another theory for the pilaster capitals, another theory for the arcades, another theory for the cornice and another theory for the masonry above the cornice. What has misled Mr. Ruskin and many another investigator is a deceptive bend in the masonry stripes for which many analogous cases can be cited in Byzantine construction.

(*e*) Occasional cases of leans in circular buildings or towers which are not due to accident, and tending to raise a question as to others in which the evidence for accident is not clear, but simply presumptive, and based on the supposed improbability that any building made by common-sense mortals should be unlike those made by nineteenth century common-sense mortals. Positive cases of lean by construction are the Baptistery of Pisa, the Bargello Tower at Florence (Fig. 4), and the Torre del Publico of Ravenna. (The intention in the case of the Leaning Towers at Bologna is, up to date, the only case conceded.) Two cases of leaning towers in Pisa exhibit curves toward the perpendicular which are analogous to the curves of the leaning façades.

(*f*) Curves in plan of horizontal cornice lines. Many correspond in delicacy to those known for antiquity (see ARCHITECTURAL RECORD for April, 1895), and I am positive that they are a classic survival. A very fine case, where thrust is wholly out of question, is the cloister of the Celestines at Bologna. It is the exact counterpart of the court at Medinet Habou as regards use and place of the curve (see ARCHITECTURAL RECORD,

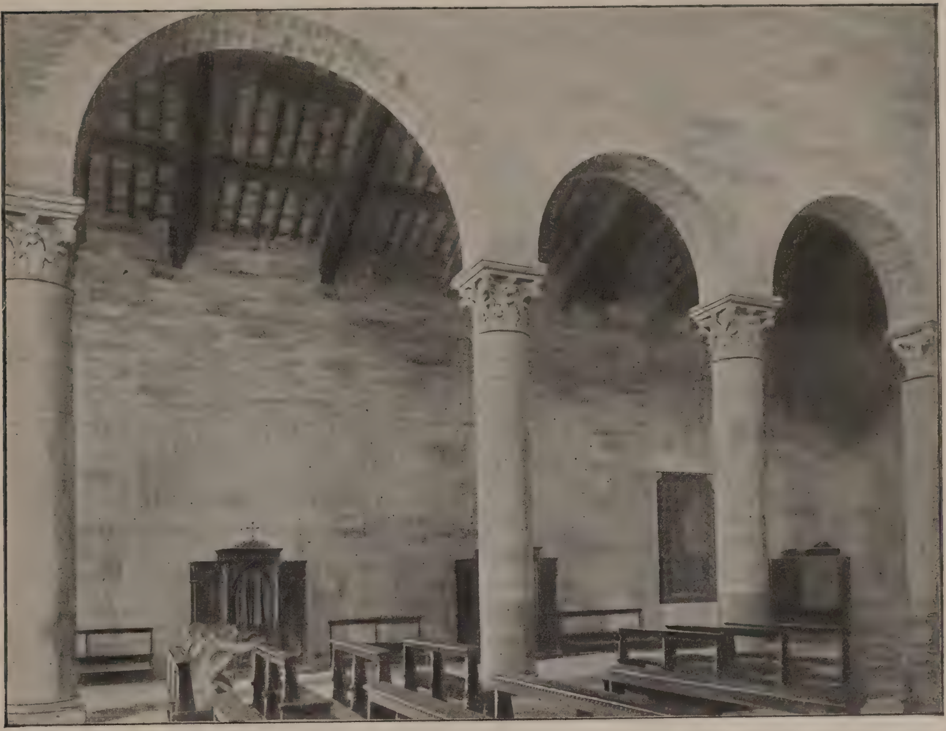


FIG. 6.—ARCHES OF THE FIESOLE CATHEDRAL.

Photographed by the Brooklyn Institute Survey. The maximum diminution in spacing toward the choir is about eight feet.

April, 1895). Many other cloisters to be quoted.

(*g*) Curves in plan in the alignment of columns and in clerestory walls (see Fig. 5) will be specified in detail. Good cases at Fiesole, Genoa, Trani, Ravenna (San Apollinare Nuovo), etc. These curves degenerate in the later Middle Ages into bends which may easily be ascribed to careless building, when considered as isolated cases. Such bends are more probably careless constructions of the earlier and more regular curves.

(*h*) Curves in elevation. There can be no suggestion of thrust for curves in elevation. There can be no suggestion of carelessness for an exact and regular curve in elevation. There can be no suggestion of accident for curves which are invariably curves convex to the sky line. If accidental, why are not some curves concave to the sky line? The announcement that many wholly regular curves, both in plan and in elevation, corresponding in delicacy to those of Greek art, are found in Italy will excite scepticism and derision. I am prepared to meet both, and to furnish the evidence. A good case for a curve in elevation is the alignment of the plinths supporting the columns in the north aisle of the Pisa Cathedral. The chances of accident in this arrangement are 3,628,800 to one against accident.

(*i*) A refinement which consists in increasing the size of the arches near the main entrance of the church and diminishing either space, or height, or both, in the direction toward the choir, thereby giving to the building an effect of greater dimension. The eye is disposed to take a large bay near at hand as the standard of size for all the others. Over thirty different churches in Italy can be specified for this phenomenon. There is a good case in the Cathedral of Fiesole (Fig. 6). Aside from announcements which I have previously made, there is so far no publication of the fact that these perspective illusions were common in mediæval Europe. It was suggested by a New York architect many years ago to whose attention I had brought certain cases of this peculiarity *in Northern Europe* that the narrowing of arches toward the choir was designed to strengthen the church under the dome or against the arches of the transept. I shall, therefore, take pleasure in publishing a list of Basilicas having this peculiarity which have no transept, and another list of churches in which the span narrows in the choir *away* from the dome or the transept arch.

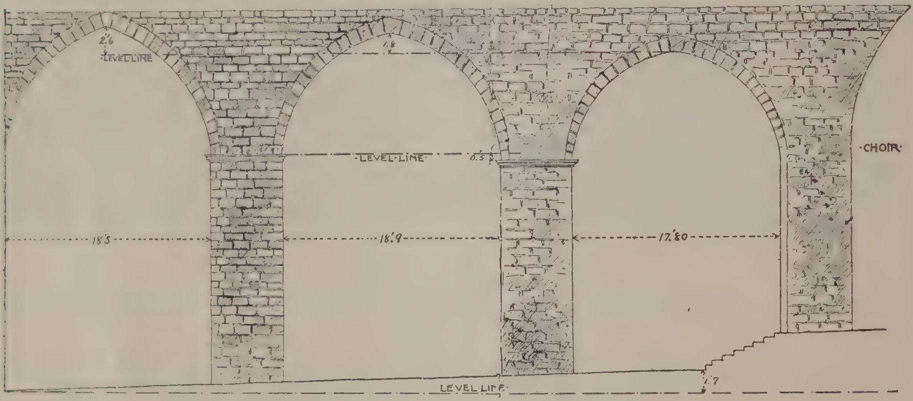


FIG. 7.—SAN PIETRO AT ASSISI.

Section showing a drop in arches of 2.60 (feet and decimals) and pavement rising 1.70. Survey and drawing by John W. McKecknie for Brooklyn Institute Survey.

(*j*.) A refinement analogous to the last but applied to the second of the two transverse arches which span the nave of a church at the junction with the transept. By dropping this second arch below the level of the first a considerable increase of perspective is obtained. There are good cases of this scheme in the Cathedrals of Siena (drop of five feet), Piacenza (drop of four feet), and Pisa (drop of three feet), and in Santa Maria Novella at Florence (drop of two feet). There are no extant publications of these facts.

(*k*) A refinement which consists in a pavement sloping upward toward the choir, nearly always with arches and capitals brought down to the horizontal level, and sometimes with capitals and arches brought below the horizontal level. The effect in either case is one of perspective illusion. I can specify eighty-five cases of this phenomenon for Italian churches. The slope varies from three or four inches to over three feet. The church of Santa Maria Ara Coeli at Rome, the Capella Palatina at Palermo, the Cathedrals of Siena and Orvieto are among this list. This phenomenon has been overlooked by all publications up to date, as far as known to me. I can specify many interesting cases of oversight on the part of persons known to me of this peculiarity. There is no reason why it should not be noticed by tourists for pleasure as easily as by experts, but it seems to have escaped the notice of both classes. This fact is quoted for the Egyptian temples, and in them is supposed by Egyptologists to have the purpose of perspective illusion. The evidence to be submitted tends to show early Christian and Byzantine origin, as usual in all these refinements. The sloping pavement can be dated to the fifth century in San Sabina, at Rome.

(*l*) A refinement which consists in

converging the walls of the church or the piers and walls of the nave in the direction of the choir. (Fig. 8.) Five cases are known to me in Italy. None have been previously noted by publication for Italy, but one case is already known by publication for Northern Europe. It is the Cathedral at Poitiers mentioned by Fergusson. The maximum case of convergence is in San Stefano at Venice, whose walls narrow in toward the choir twenty-three feet in a length of one hundred and thirty-three feet.

(*m*) A refinement which consists in building the church with an oblique or twisted plan, so regulated as to mystify the eye as to the proportions of the building and without revealing itself as an obtrusive fact. Of all the phenomena quoted the one of a deflected choir is the only one so far known to science. There is no evidence in Northern Europe to support the view that a deflected choir represents the bending of the head of Christ on the Cross. On this point of lack of evidence see *Notes and Queries.* The idea that a deflected choir represents the bending of the head of Christ on the Cross may be a fancy of modern sentiment, or it may be a tradition springing from the explanation of some mediæval builder who found it inconvenient to give his true reason. The evidence which I have collected in Italy antagonizes this explanation, because there is no trace of this tradition in Italy, because the phenomenon appears in many churches which have no transept and which consequently do not represent the Cross (see Fig. 9), because there are cases in which there is no bend or deflection of the plan, but only an obliquity of the whole plan, and other cases where there is obliquity and where one side of the church is longer than the other, but no bending of the choir, and because these cases merge into others which simply show the curve in plan of columns or clerestory walls (one or both), which is the earliest dated phase (sixth century at Ravenna). In other words, the deflected choir of Northern Europe is only one phase of a wider fact, which no doubt also has many Northern illustrations (some of which are already known to me). I have collected thirty-six cases of these curious plans in Italy, and many of them have been carefully surveyed. Good instances are found at Arezzo, Bari, Toscanella, Viterbo, Cremona, etc. Nearly all are oblique from the façade as distinct from churches with a deflected choir.

(*n*) There are many phenomena which are most easily classed under the general heading of symmetrophobia, or dislike of mathematical symmetry. This designation has the advantage of avoiding optical theories or optical explanations, and may be applied to many facts already cited under foregoing heads if other explanations offered, or to be offered, should not satisfy the reader. This designation may be applied, for instance, to the oblique or twisted ground plans by any one wishing to preserve an agnostic attitude as to explanations of curious facts. Mr. Ruskin's conception of "life" in mediæval building is preferable to the conception carried by the term "symmetrophobia," which implies a negative attitude on the part of the mediæval builder, whereas all the motives which tended to give variety to a building by discarding symmetry tend also to this effect of "life." Some cases, like the bent column at Arezzo (Fig. 10), seem to be pure symmetrophobia. As I have a long list of phenomena for later description, which have not been cited by Mr. Ruskin, and which do not come under any of the classes so far mentioned, we will use the word "symmetrophobia" provisionally to designate them. This word, by the way, is not one of my own coinage, as has been supposed by some. It has long been applied to the irregular features of Egyptian temples (for example, at Philae), and originated in Egyptology or with persons interested in it.

IV.

The foregoing schedule, in spite of its length, is wholly tentative and preliminary. It is a condensed statement needing much elaboration and

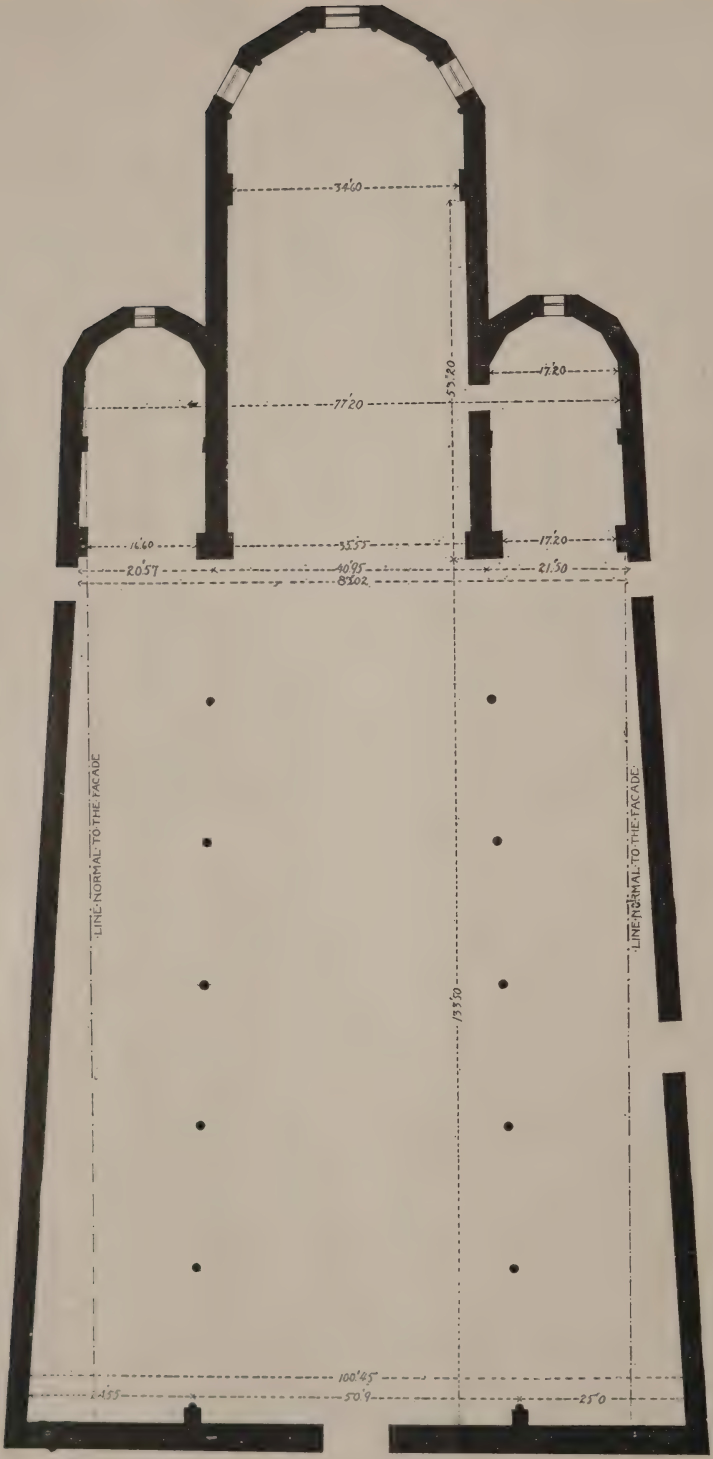


FIG. 8.—GROUND-PLAN OF SAN STEFANO AT VENICE.

The walls narrow in 23 feet in 133 feet. The nave narrows in 16 feet. Survey and plan by John W. McKecknie for Brooklyn Institute Survey.

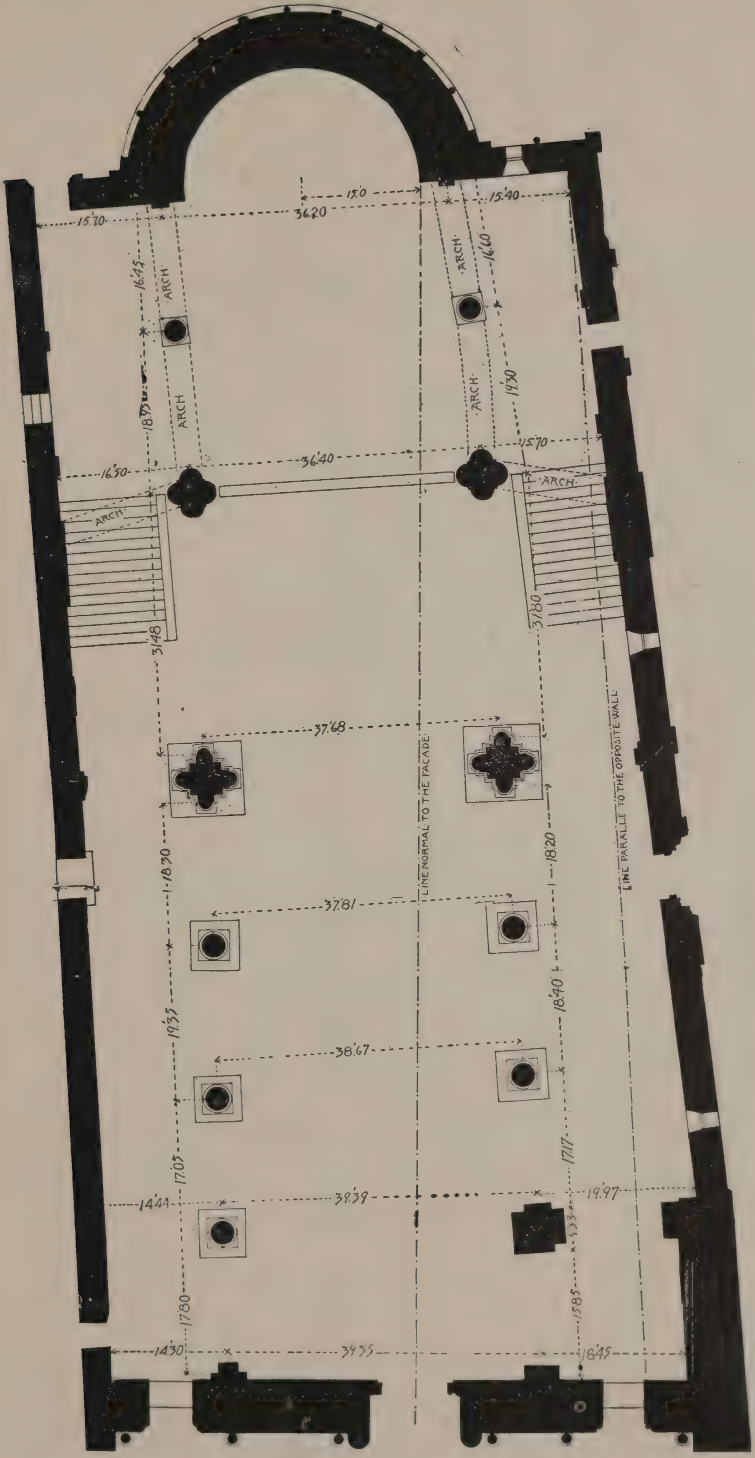


FIG. 9.—GROUND-PLAN OF SANTA MARIA DELLA PIEVE AT AREZZO.

Survey and plan by John W. McKecknie for Brooklyn Institute Survey. The church is deflected 15 feet from the normal line.

development, and is a mere hint of the actual facts, which have to be specified for about one hundred and thirty-three churches, many of which need careful description and all of which need very abundant explanations in rebuttal of suggestions of accident, carelessness, indifference and the like.

This schedule is, however, sufficiently definite and explicit to permit of my announcing the general main fact of what I conceive to be an epoch-making discovery in the study of mediæval architecture. As distinct from views hitherto held by the most enthusiastic students of the Middle Ages, I shall be able to prove that, apart from the beautiful variations of detail due to artisan skill, and apart from the picturesque effects of general organism due to a noble contempt for mechanical regularity, there was in mediæval building a definite system of optical and perspective illusion very largely, but not universally, practiced —a definite system of very subtle calculation of optical effects—a definite system of *masonry refinements*—and a definite system of survivals of some of the most remarkable architectural refinements of classic antiquity. I shall be able to prove, moreover, that the facts, in so far as they are made manifest for Northern Europe, move from Italian influence; that in Italy they move from the Italo-Byzantine centres, and that the facts are most numerous for the period and buildings of the Byzantine-Romanesque. Dates are established for the curves, the sloping pavements and the converging walls which carry them back to the earliest extant buildings of Christian architecture.

The germ of these discoveries goes back to measurements which I made at Pisa in 1870, and which were published in *Scribner's Magazine* for August, 1874, under the title of "A Lost Art."

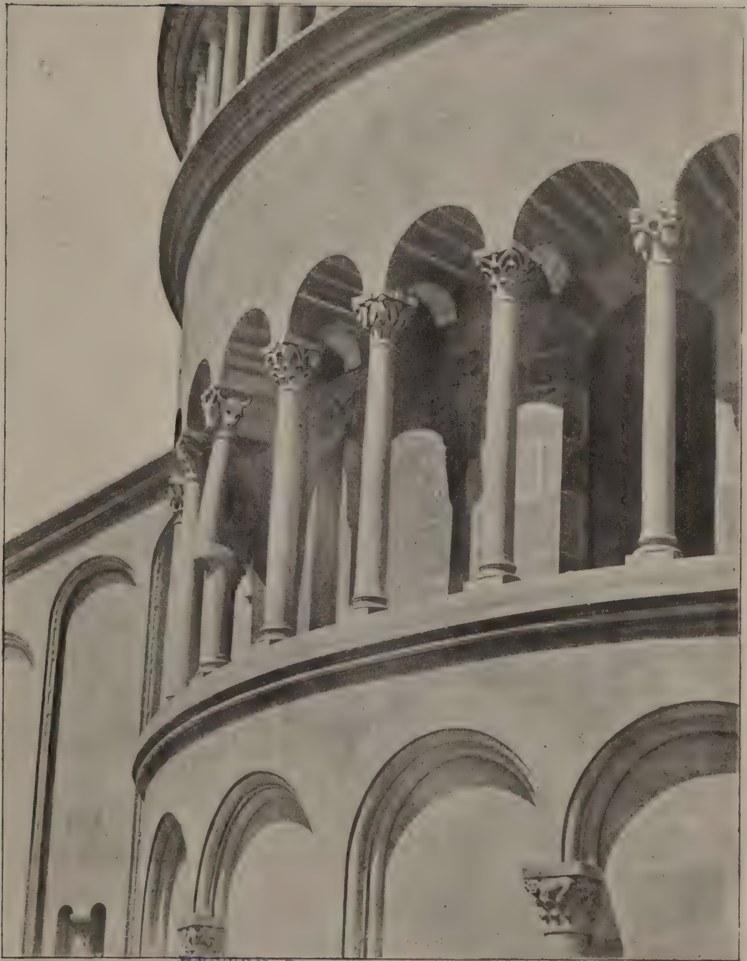
I claim that the study of mediæval architecture stands to-day where that of the Greek temples stood before the discoveries of the Greek architectural refinements by Pennethorne, Hoffer and Penrose. It is well known that all the studies of mediæval architecture lie wholly within the limits of our own century and that they date mainly after 1825 or later, whereas those of the Greek temples date from the middle of the eighteenth century. I have shown in THE RECORD article already quoted that the Parthenon had been surveyed and carefully examined during nearly a century, before the discovery of its curves, leaning faces, irregular spacings, and other optical refinements, which were first published by Penrose in 1851. The beginning of the study of mediæval cathedrals is, as a matter of fact, fully seventy-five years later than the beginning of the study of Greek temples; and if, in the last years of the nineteenth century, we are still ignorant of some of the most interesting traits of many important cathedrals, we are only repeating the experience of history that discoveries come gradually, and that the wisdom of all the ages has not been conquered in a day.

That the attainments of past ages have been forgotten and lost sight of and have had to be rediscovered is no unfamiliar thing. A most telling instance is that of the Greek refinements just cited whose existence had disappeared from the memory and apparently from the records of man until once more brought to light in the nineteenth century.

The success of the Survey in Italy was much indebted to the favorable disposition of the Italian Ministry of Public Instruction, as represented by Signor Ricchiardi. I obtained from him the extraordinary favor of a *carte blanche* permit to take measures and photographs in church interiors throughout the country, and to photograph in all Government museums. For this concession I have to be grateful, in the first instance, to the influence of the Smithsonian Institution, as represented by Professors Langley and Goode.

Wm. H. Goodyear.

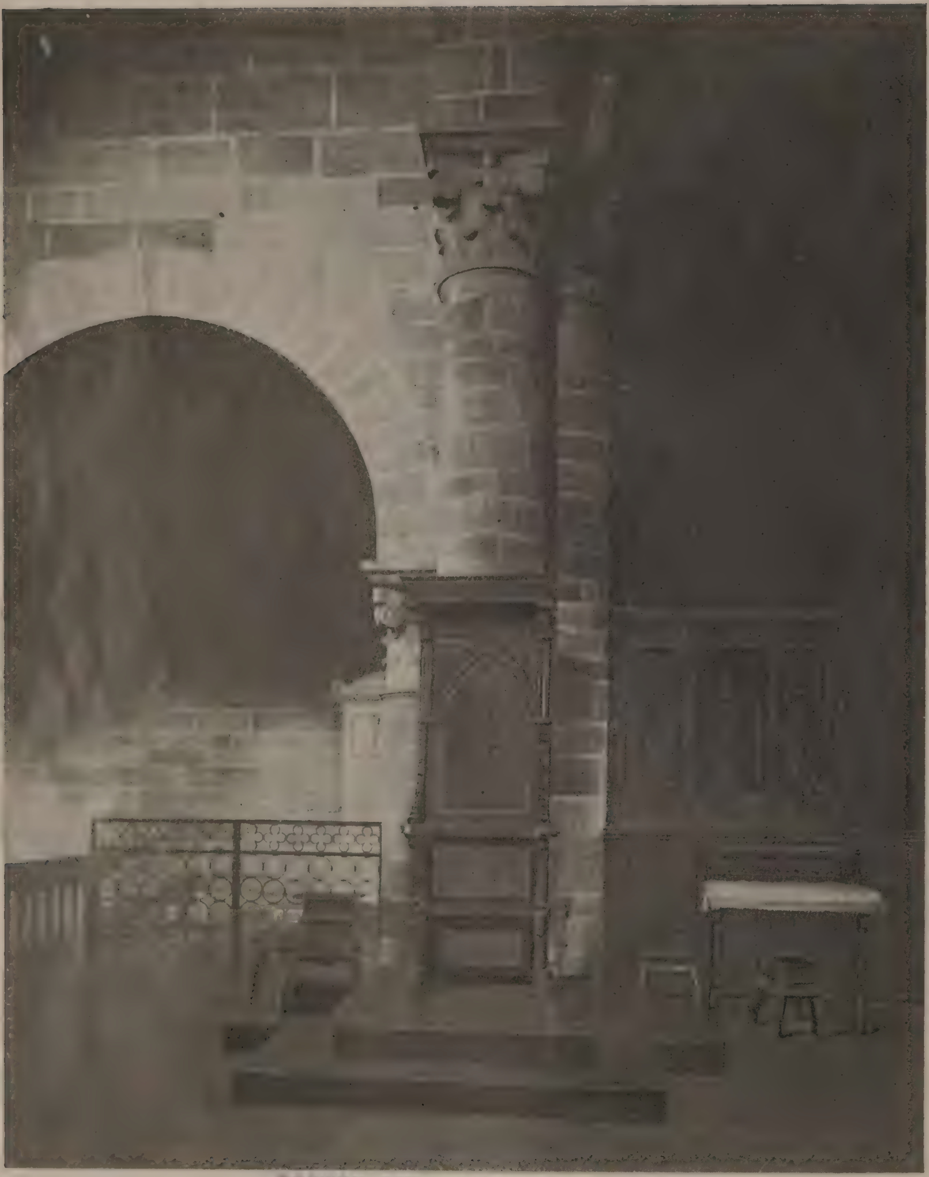
(To be Continued.)



BOSTON PUBLIC LIBRARY.

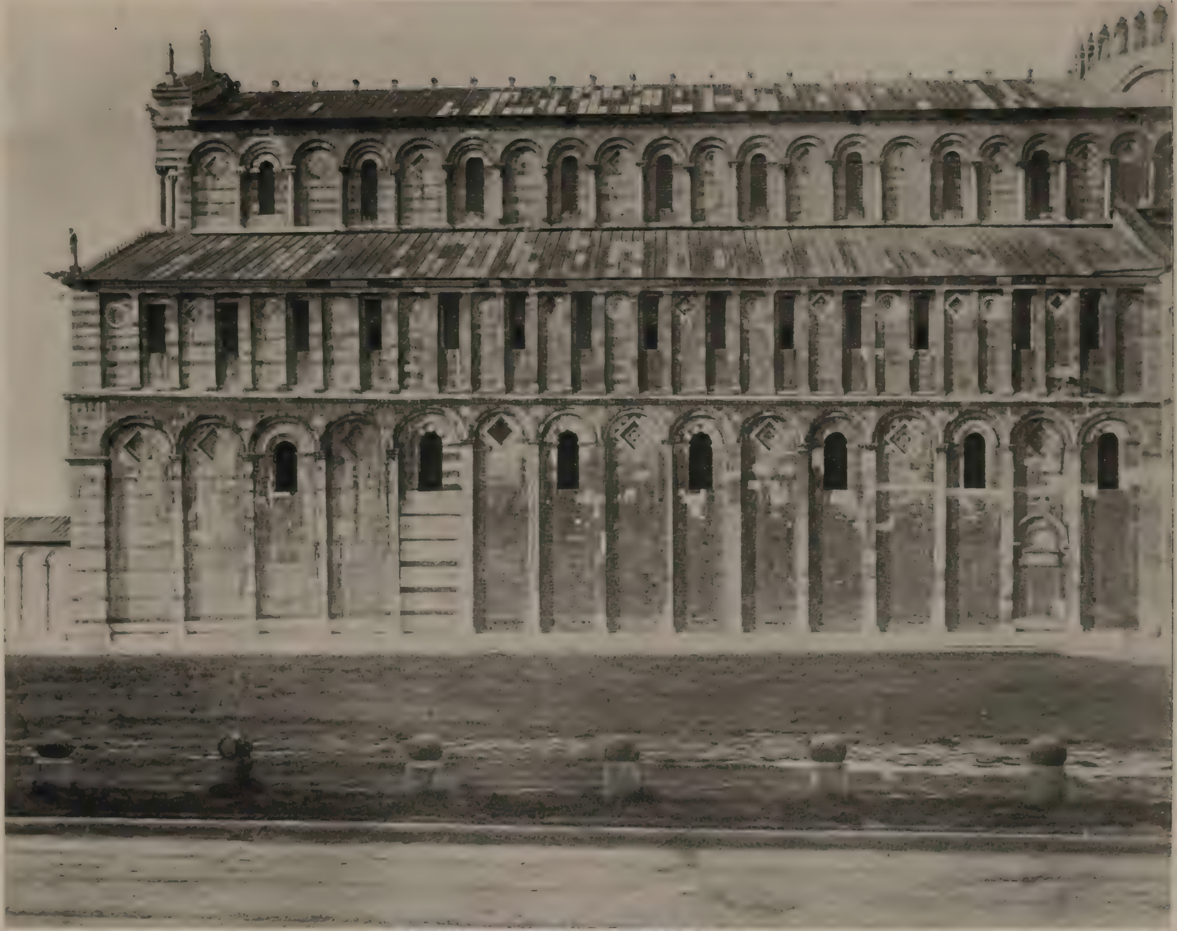
FIG. 10.—CHOIR GALLERY OF SANTA MARIA DELLA PIEVE AT AREZZO.

Showing a bent column, Photographed by the Brooklyn Institute Survey.



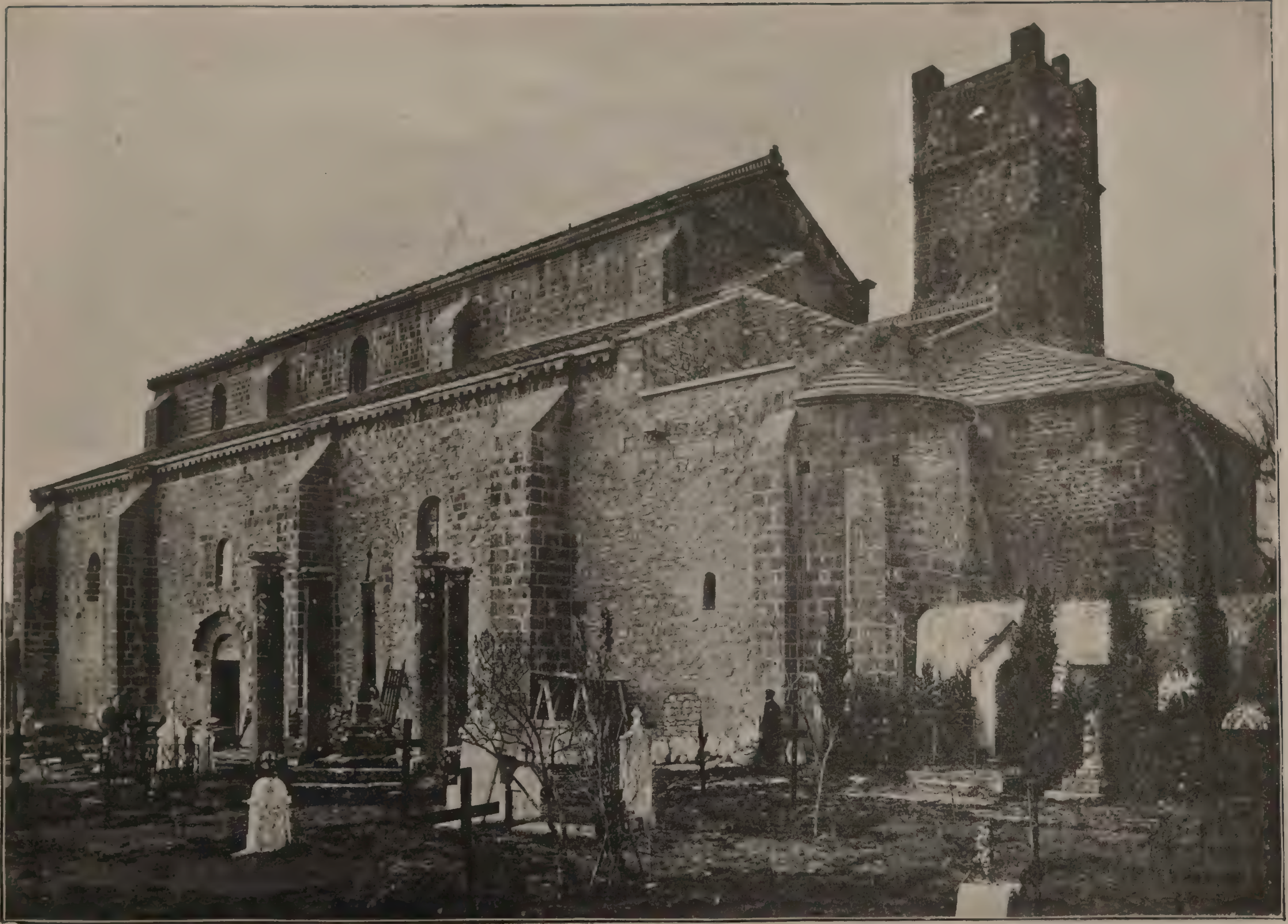
BOSTON PUBLIC LIBRARY.

FIG. II.—MEDIÆVAL SURVIVAL OF THE CLASSIC ENTASIS, CATHEDRAL OF FIESOLE.
Photographed for Brooklyn Institute Survey, by John W. McKecknie.



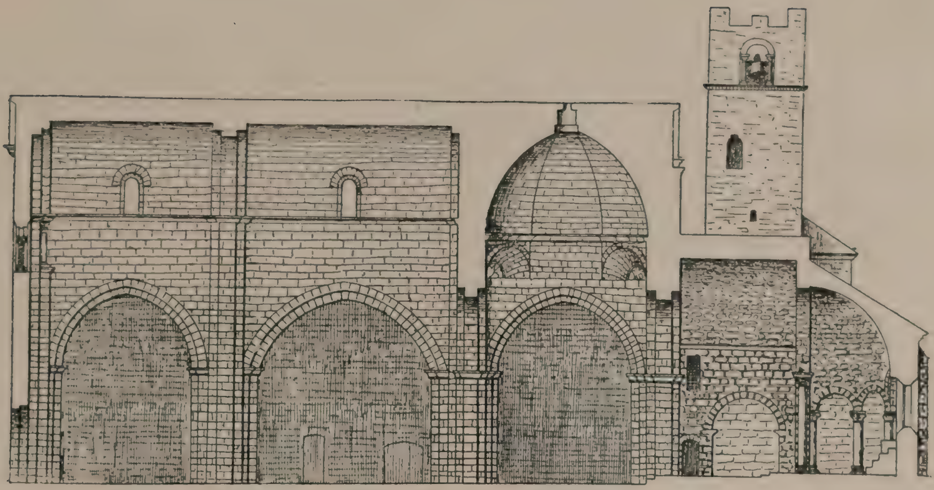
BOSTON PUBLIC LIBRARY

FIG. 12.—SOUTH WALL OF THE PISA CATHEDRAL IN PARALLEL PERSPECTIVE.
Photographed for Brooklyn Institute Survey, by John W. McKecknie.



BOSTON PUBLIC LIBRARY

CATHEDRAL OF VAISON—FROM THE SOUTH.



LONGITUDINAL SECTION OF THE CATHEDRAL OF VAISON. From de Lesteyrie

FRENCH CATHEDRALS.

Part VII.

THE CATHEDRALS OF PROVENCE. III.

THE cathedral of Vaison is generally conceded by French archæologists to be one of the oldest in France. It is a singularly interesting structure, almost homogeneous in design, yet bearing obvious marks of having been built at different intervals of time, considerably separated from each other. Its walls, though continuous, show various sizes and finish of stone, and are clearly referable to distinct epochs. But the interest of the cathedral is more than purely antiquarian.

As you drive into Vaison on top of the stage from Orange—for there is no other way of reaching this sequestrated little town unless you hire a conveyance of your own, a most unnecessary expense—you see nothing of the city and its cathedral until you are almost there. Then you see the ruins of the château arising above the High city, for small as the place is, there are two parts, a Low Vaison and a High Vaison ; and presently, on turning a corner, there is a small low cathedral, quite outside the town, in the fields. Both in situation and in general external form it has a somewhat striking resemblance to the basilicas without the walls of Rome. It is, perhaps, only a superficial resemblance, but it is a comparison suggested by no other church in France. The cathedral is small, and nothing survives of its group of buildings save the church and the cloister. Alone in the fields outside the town, it seems more like a deserted chapel than the cathedral church of a once flourishing city.

Though the plan of the cathedral is almost certainly as early as the tenth century, it is a three aisled church, with three apses. It is thus much more complicated than the cathedrals of Avignon and Aix, as well as several other Provençal cathedrals with single naves, whose date may, with the utmost confidence, be placed in the eleventh century.

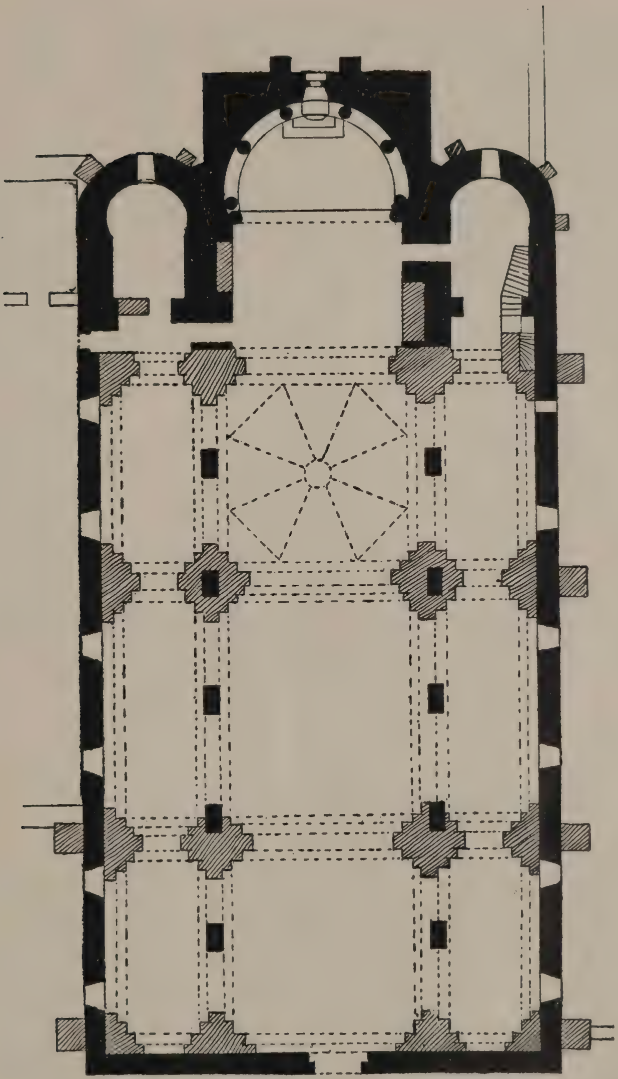
The most ancient parts are the apses. Those of the aisles are very small, and semicircular both within and without; that of the nave is larger, and semicircular within, and enclosed within a heavy rectangular mass without, which is probably a later addition. Each is preceeded by a deep rectangular bay, built of larger stone that has no junction with the stone of the apse walls, and appears to be later in date. The same construction is seen in the semidome of the nave apse, which is therefore a rebuilding, but still earlier than the western parts of the church. This central apse is an extremely interesting structure. Its wall of rough ashlar work has an internal arcade of five round arches resting on columns of unequal length, the short ones being pieced out below, and all evidently taken from an earlier edifice. The capitals, which are well cut and resemble the work of the fourth and fifth centuries, and reproduce the Corinthian motif, are of various materials; one is of black marble, two of white, two of cipolin, and the sixth is a restoration. Larger columns, pieced at the top, carry the pointed arches that open into the rectangular bays, which have pointed tunnel vaults, slightly higher than the semidome. It is known that the cathedral was rebuilt by Bishop Humbert in 910, and the rectangular bay may belong to that time, the semicircular portion being earlier.

The nave is a short one of three bays, each of slightly differing dimensions which give a peculiar form to its plan. The third, which immediately precedes the choir, has an octagonal dome. Its construction is of the usual type, with small pendentives with the symbols of the Evangelists, but unlike other Provençal domes it does not rise above the roof of the cathedral, and is actually slightly lower than the pointed tunnel vaults of the other bays. The double piers of the vault arches have as capitals, a fine narrow classic band, which is continued as a string at the base of the vault. The arches opening into the aisles are relatively low, with considerable wall space above them; like the nave arches they are double and pointed, but their small irregular capitals testify to their slightly varying dates. In the first two bays small windows are cut into the vault.

The aisles, as in all ancient churches in Provençe, are extremely narrow. They have elliptical tunnel vaults, which, rising on the outer walls at a point below the apex of the arches to the nave, are returned on the inner side a short distance above them. Double arches of similar shape separate the bays, and the enclosing walls have double pointed wall arches, slightly lower than those between the nave and aisles. There are no windows in the north aisle, but the south aisle is lighted by small round-headed windows, which, however, do not occupy the space of the older windows, now blocked up, but clearly discernable in the stone work. The nave is lighted by small round-headed windows cut into the vaulting.

The little blocked-up windows of the aisles are traces of the edifice of the tenth century, rebuilt by Bishop Humbert. Like the present building, it had a nave and aisles. It was six bays long, the nave being formed by a succession of short arches carried on piers, some of which are encased in the present piers, while others have been removed. The absence of external buttresses corresponding to the older bays shows that the church was covered with a wood roof without vaults. The church was the same size as the present structure, the alterations and changes having, singularly enough, been confined to the ancient dimensions. The present form of the cathedral is that of a church of the middle of the eleventh century, to which period the nave and aisles clearly belong.

Though small, low and plain, almost deficient in ornament, and exhibiting only the simplest architectural construction, the interior of the cathedral of Vaison has a real charm of simplicity and antiquity. Against the wall of the nave apse, in its primitive place in the centre of the sanctuary behind the high altar, is the ancient episcopal throne. It is now much injured; the seat and arms are intact, but the columns that once supported

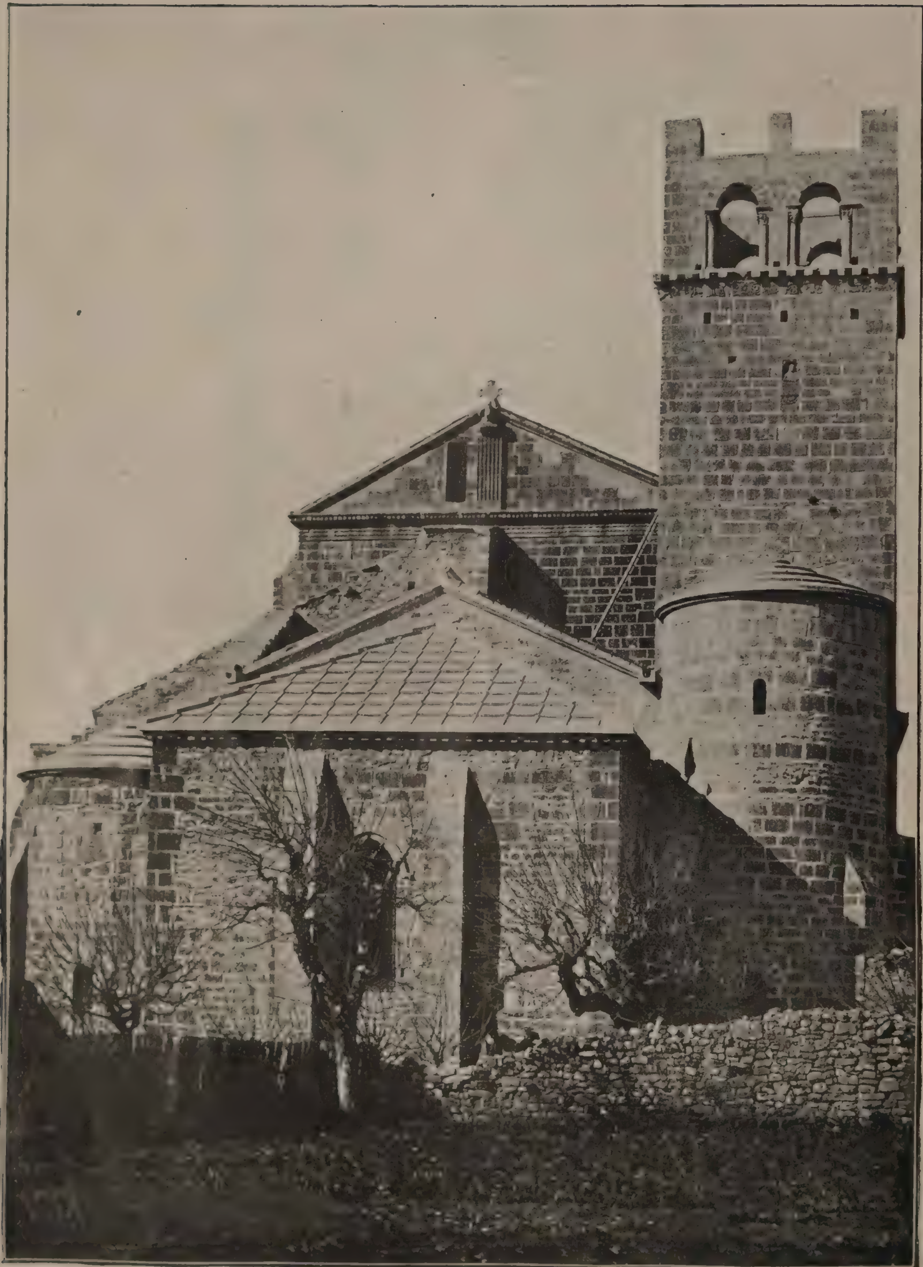


PLAN OF THE CATHEDRAL OF VAISON.* From de Lesteyrie.

*Black shading indicates construction prior to XIth. century; the hatchings indicate the later additions and present state of cathedral.

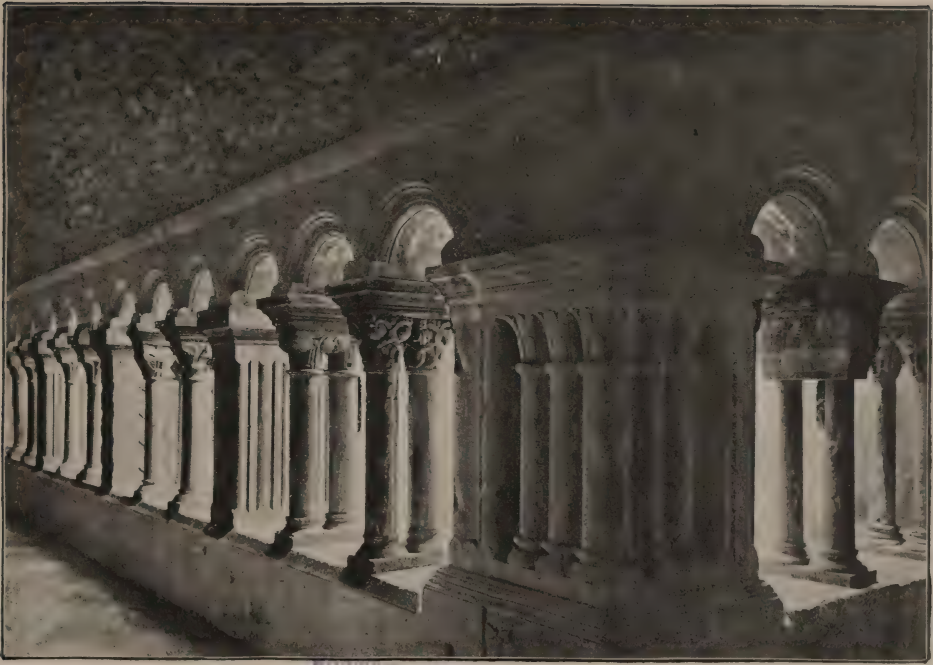
the latter have partly disappeared. It is attributed to the sixth century, from which also dates the altar of St. Quenin, which now serves as the high altar, a work of extraordinary interest, considerably restored.

The exterior of the cathedral is quite as interesting as the interior, though the west front is featureless save for a panel with Corinthian-like capitals and a triangular top piece placed over the insignificant porch. The side walls are almost as simple, but the outline of the church, viewed from the southeast, is extremely pleasing, and almost picturesque. The aisle wall, in which the various periods of its construction are distinctly visible, is strengthened by four plain buttresses, with sloping tops, which like all the buttresses of the cathedral, save those of the central apse, are ad-



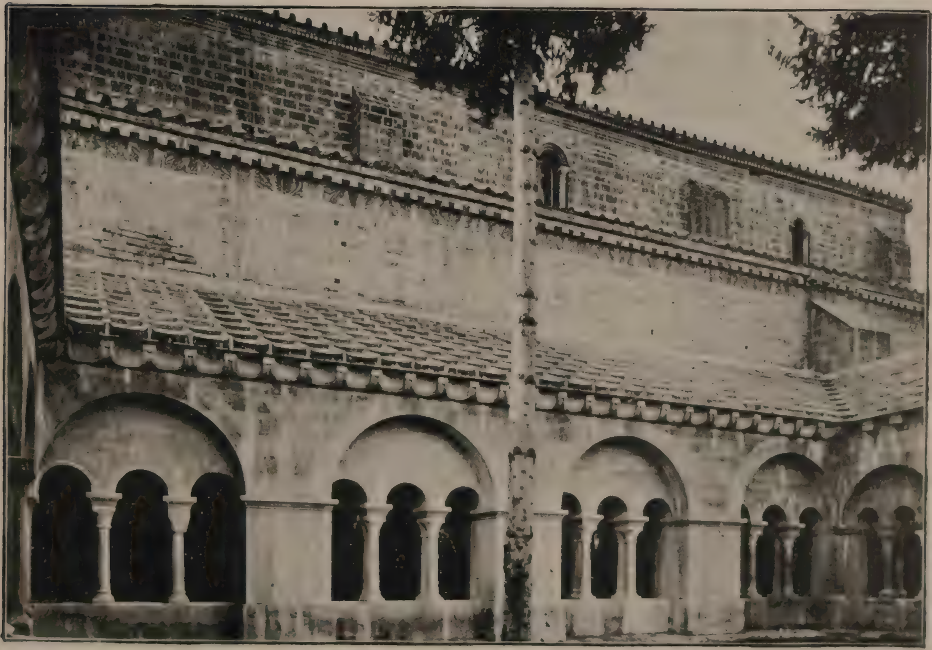
BOSTON PUBLIC LIBRARY

CATHEDRAL OF VAISON—EAST END.



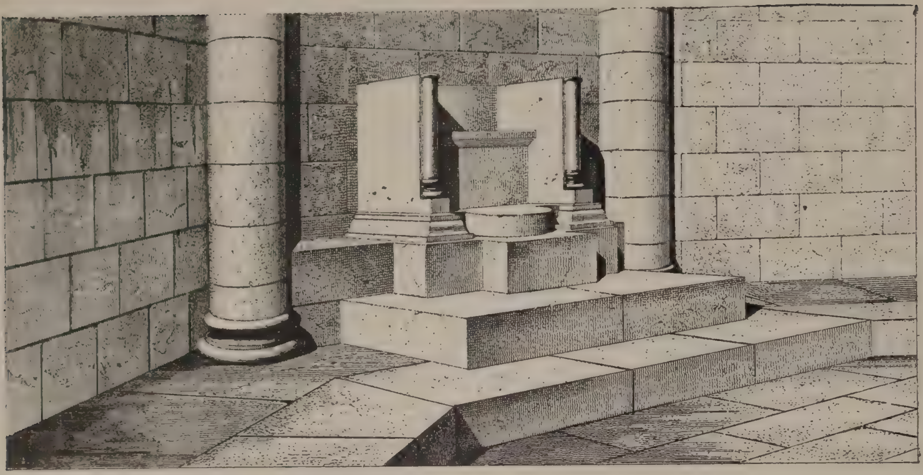
BOSTON PUBLIC LIBRARY

CATHEDRAL OF VAISON—THE CLOISTERS.



BOSTON PUBLIC LIBRARY

CATHEDRAL OF VAISON—NORTH SIDE, WITH RESTORED CLOISTER.



EGLISE ET CLOITRE—DE VAISON.

ditions made in the repairs of the eleventh century. The windows are small and frameless, and the wall is crowned with a dentiled cornice, above a freize of flowing foliage with rosettes. Both the cornice and the carved band project over the buttresses. The clearstory of the nave rises above the modern red tiles of the aisle roof. Like the lower wall it is plain, with short buttresses and a cornice, formed of a series of narrow flat bands separated by a delicately carved egg-and-dart ornament, with dentiles above. The first two bays have each a small window with carved arches and flutted twisted columns.

The aisle wall is continued irregularly beyond the last buttress. Though the whole of the east end is without ornament, except the small buttresses on each side of the apse windows, the varied levels and shapes of the roofs, and especially a stairway rising just behind the roof of the south apse and leading to a narrow arched opening in the eastern gable of the nave clearstory, produce a somewhat picturesque effect, with utter frankness of construction. The nave clearstory has its side cornice returned across the end, with a chanelled pilaster above supporting the apex of the roof.

The apse of the north aisle has been built up to a height almost equal to the central apse. The tower, a square solid structure, is behind it, rising a short distance above the nave roof. Over a freize and cornice similar to those of the north aisle is a crowning member, later than the lower part. It has two round arches on the east and west faces, and a single one on the others, with widely spaced battlements above.

The cloister, built in the eleventh century, is on the north side of the cathedral, and fills all the side, save a small part at the west end, where the aisle wall is strengthened by buttresses as on the south wall. The freize, however, is much more interesting, and consists of a series of conventionalized leaves, partly the original stones, partly restorations, and partly lost in some places. Below is an inscribed band of the eleventh century with the names of the early bishops of Vaison. The nave clearstory repeats the features of the south side, though there are no corresponding buttresses in the aisle wall below. The columns of the clearstory windows are plain, with several new ones.

The cloister is small, and completely restored, the work being still in progress under the direction of M. Révoil. Restoration here, as is usual in France, means almost an entire rebuilding, and little of the original structure now remains, much of it having been destroyed before M. Révoil began his work, and the side next the cathedral never having been built, or least destroyed to the foundation. It is a rectangle, of which the north and south sides are longer than the east or west, the difference in width being taken up in the piers. The arcade consists of groups of three round arches carried on double columns standing on a low base-wall. On the quadrangle side the arches of each bay are enclosed in a single plain round arch, not repeated within, where each group is separated by heavy piers, decorated with diagonal or vertical lines or, on the corners, with applied columns. There are four bays on each side, and on the north the two central ones, with enriched arches, serve as entrances to the quadrangle. The walks have round tunnel vaults, forming cross vaults at the corners, but part of the north walk has rude cross vaults. The whole cloister is extremely severe in its architecture, though a good deal of its present effect is doubtless due to the fact that most of the original capitals of its columns have disappeared. Some, indeed, never having been cut, but left in the solid block. But its sobriety is eminently in keeping with the architecture of the cathedral, whose distinguishing characteristics are, however, of the greatest interest, making it, in some respects, one of the most notable in France, though one of the smallest.

Barr Ferree.

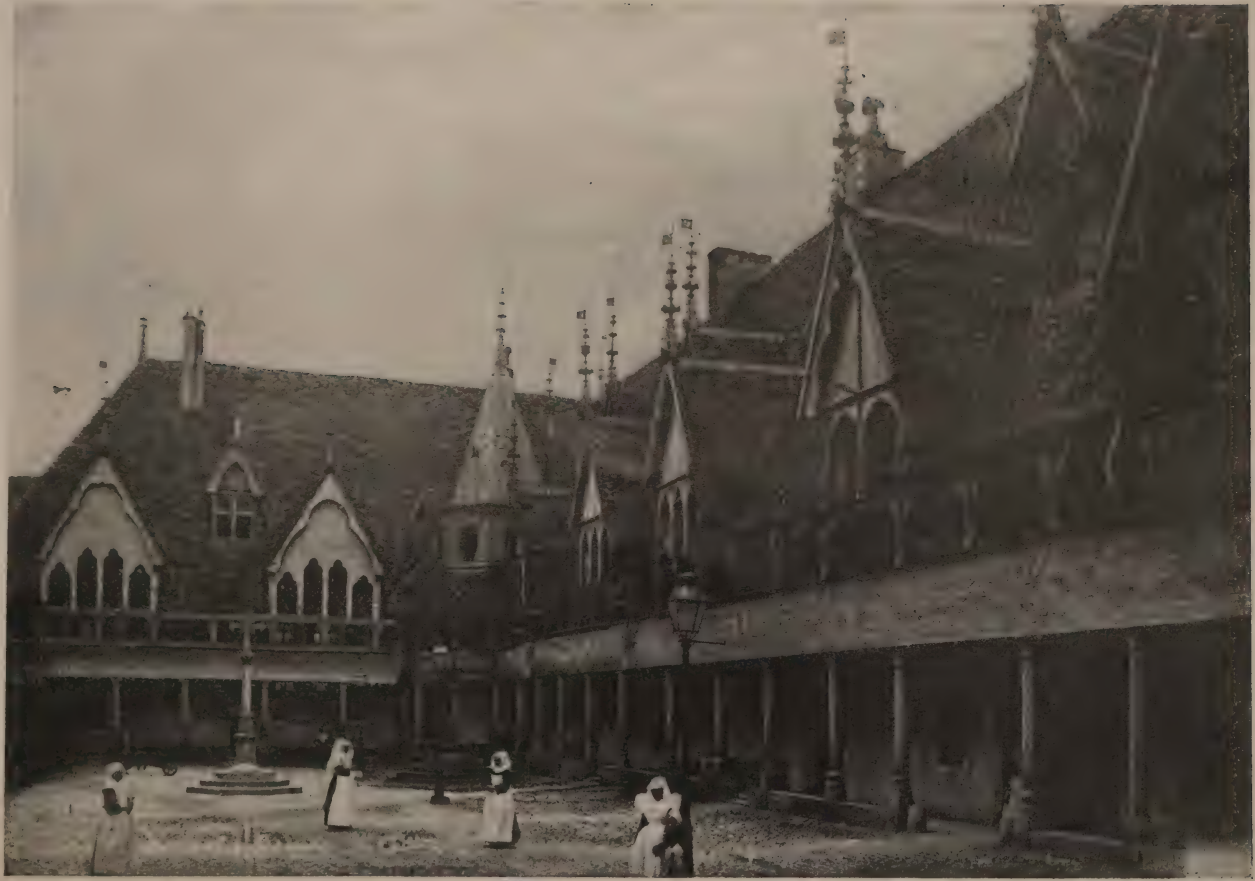


Fig. 2.—Hospital Beaune—The Court.

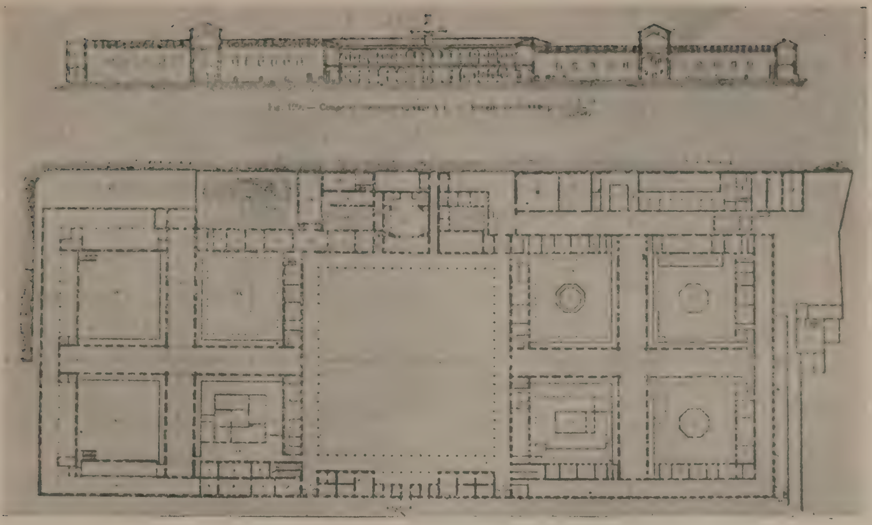


Fig. 1.—Hospital Maggiore, Milan—Plan.

MODERN HOSPITALS IN EUROPE.

DURING the last quarter of a century, and especially during the past fifteen years, hospital architecture has undergone considerable changes—in fact, an almost complete transformation. Formerly, all the departments were collected together; the buildings containing them crowded as closely as possible to each other, and it was thought that perfection had been attained when long wards were arranged on two or three floors around large court-yards, whence they received light and air. Europe still possesses a few examples of this kind of hospital. They are far more remarkable for the facility with which they can be worked and supervised, and for their graceful proportions, than for the strict conformity to hygienic laws displayed in their construction. The best specimens of this primitive hospital architecture are met with in France and Italy. France points with pride to her hospitals at Beaune and at Tonnerre, while Italy claims that at Milan she has the most magnificent edifice of the kind that the Renaissance produced; the one that long served as a model of general hospital for large cities.

The *Ospedale Maggiore* at Milan is a work of the highest class, in which all the improvements known at the time of its erection were incorporated. As will be seen by the plan (Fig. 1), it covers a large piece of ground of regular shape and consists of a number of long buildings intersecting each other at right angles, with large court-yards or gardens between them. The external aspect is imposing and picturesque. This hospital was founded in 1456 by Francesco Sforza, Duke of Milan, and was designed by Filareta. After the death of this architect, the work was continued by Richini, who at first followed the original plans, but afterwards made certain changes in the style. It was enlarged by Castelli at the end of the last century. It has nine interior court-yards. Its large central courtyard is very fine, but the principal façade is the feature that most merits attention. The large pointed windows are surrounded by elegantly designed bas-reliefs in red terra-cotta, producing a highly original effect. This hospital can accommodate 2,000 patients. It could not be further enlarged without violating the laws of hygiene, which forbid the crowding of so many sick people in one place. Consequently it cannot serve as a model.

The Beaune Hospital, although much smaller, is not less celebrated. It is laid out in a more practical manner, resembling to some extent the system generally adopted at the present day. Two main buildings extend in the form of a set-square along two sides of a spacious court-yard (Fig. 2). These buildings contain two large common wards, but the beds are placed longitudinally upon a wooden floor which is raised on each side above the flagstones of the ward. The ceilings of these wards are in wood and have that pointed-arch form which seems best suited to insure ventilation and facilitate the cleaning of the walls. The wards are on one floor only, and they are reached through an exterior covered gallery, which is visible in the view of the court-yard here given.

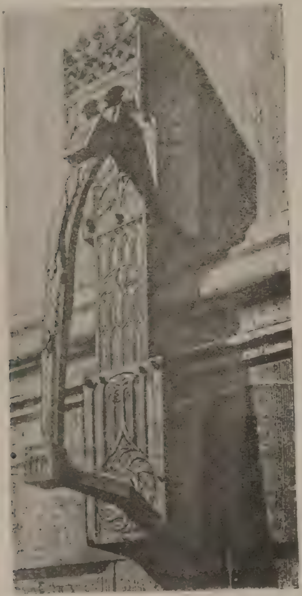


Fig. 3.—Hospital Beaune—Iron Knocker·

It should also be stated that this hospital is one of the finest specimens existing in France of civil architecture of the middle of the fifteenth century. Its gateway on the street is original, elegant and picturesque. The patterns of the carved woodwork, the sculptured stone, and the wrought-iron thereof are often copied. An idea can be formed of the elaborateness of the locksmith's work from the knocker, of which we give an illustration (Fig. 3). The generous founder of this hospital was Chancellor Raulin, counsellor of Philip the Good, Duke of Burgundy. To insure a revenue for the establishment, the Chancellor endowed it with some vineyards, which it still possesses and from which are produced the well-known Volnay, Beaune and Pomard wines. Every year, after the vintage, these wines are sold at auction and the prices realized, which often reach 1,000 francs per cask, serve as a basis for determining the value of the high-class wines of the district.

In the Middle Ages the hospitals nearly always consisted of a long room with windows on either side. At one end was the chapel, separated from the rest of the room by a grating of iron, wood, or in some cases even of stone. We have a very fine example in the Tonnerre Hospital. But what gives special value to this relic of the past is the manner in which the beds

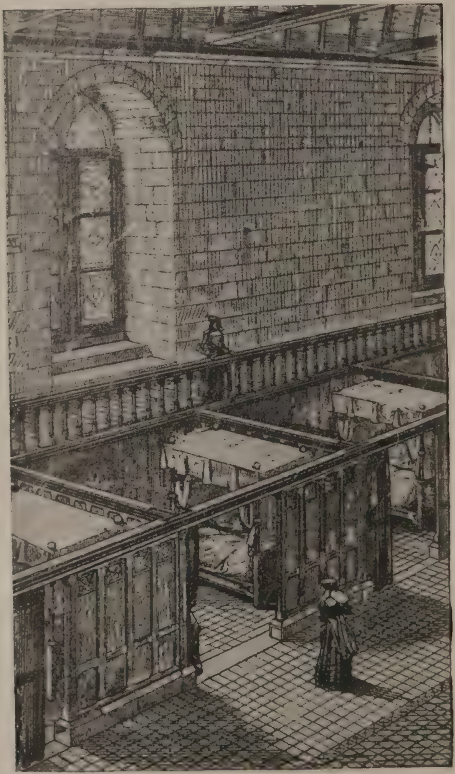


Fig. 4.—Hospital de Tonnerre—View of a Bay.

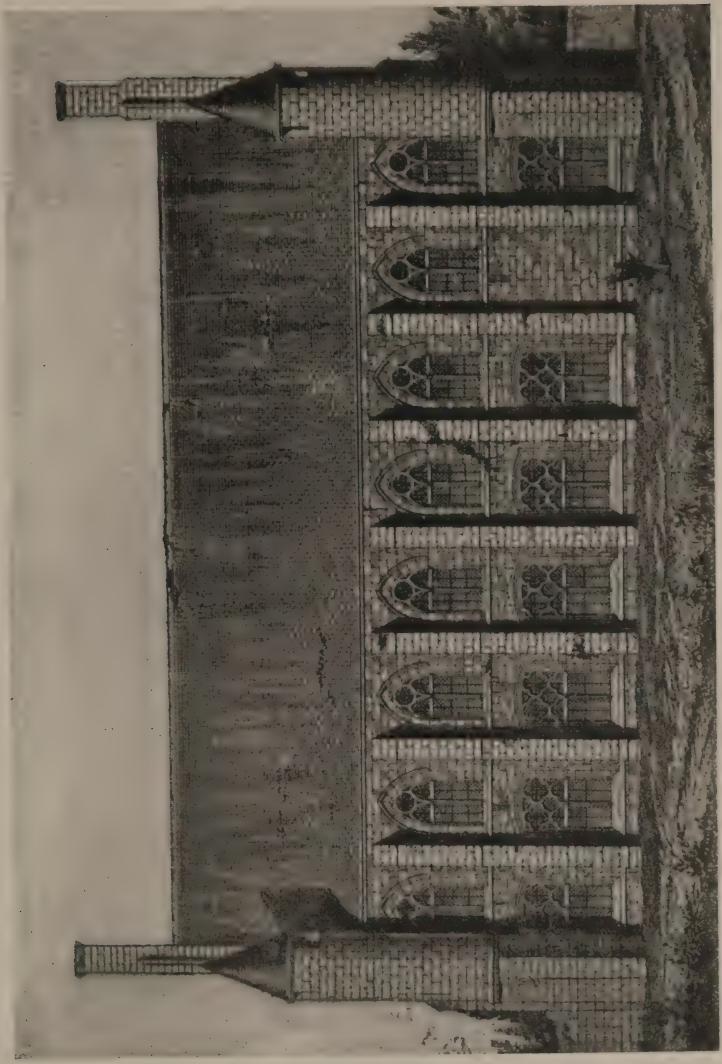


Fig. 5.—Maladierie du Tortoir—East View of Building.

were arranged, each in a sort of cubicle, above which and running round the walls of the ward was an elevated gallery whence it was easy to see everything that went on. The accompanying perspective view conveys an exact idea of one of these cubicles (Fig. 4).

In mediæval times, France, like Italy, indulged in great luxury in the matter of hospital construction. In France, this lavishness was chiefly external. The Lepers' Hospital at Tortoir, the main parts of which still subsist, offers in its principal building, dating from the first half of the fourteenth century, one of the best examples of this architecture, and we think it worth while to reproduce a lateral elevation of the eastern side of this edifice. (Fig 5).

We will not prolong our investigations into the past; it seems to us more to the purpose to deal with the present.

After Orsini's attempt on the life of Napoleon III., the imperial government undertook the task of providing Paris with a Grand Opera House, and it decided at the same time that the old general hospital, the Hotel-Dieu, should be rebuilt upon a new and more extensive plan and that every improvement suggested by experience and hygenic science should be adopted, so as to make the new hospital a model of perfection. The architect, a man of talent, brought all his powers to bear on the work, but he paid more regard to the rules of architecture than to the laws of health. Besides, he was required to provide for such a large number of beds that it was difficult to keep within the allotted space without piling up at least three tiers of wards. The plan did not differ much from the system of buildings placed at right angles to each other around a large central court-yard. It was, in fact, in an elongated form, the plan adopted for the Ospedale Maggiore at Milan. Hygienists did not fail to criticize this system severely, for two reasons, namely: the excessively large number of patients collected on one spot, and the unsatisfactory arrangements of superposed wards. The architect, however, had taken care, in planning the smaller buildings which are lateral with the large ones that run parallel to the long central court-yard, to allow between them courts or gardens having an open outlook on one of their sides. The reader can judge of this from the plan (Fig. 6).

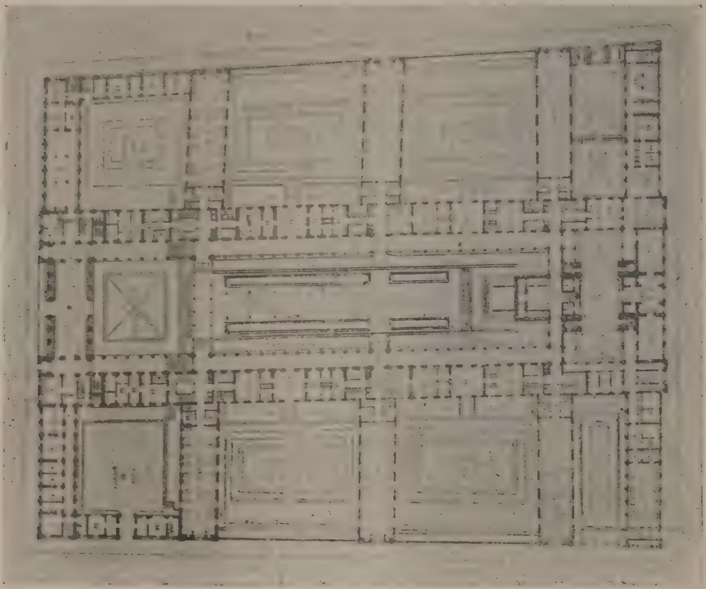


Fig. 6.—Plan of the New Hotel-Dieu, Paris.

Just when the heaviest part of the work was completed, the war broke out. Building operations were suspended for a couple of years, and upon their resumption partial satisfaction was given to the critics and to the wishes expressed by medical men. Of the three floors of wards, one was suppressed. The height of the buildings was limited to two stories, between the basements and the attics, thus diminishing the number of patients provided for, and at the same time increasing the amount of light and air. The large court-yard was left untouched; it retained its grass plots and flower beds, and the buildings bordering it kept their monumental propylæum. The perspective view given in Fig. 7 will convey an idea of this court-yard.

Important improvements were made in the interior. The ceilings of the

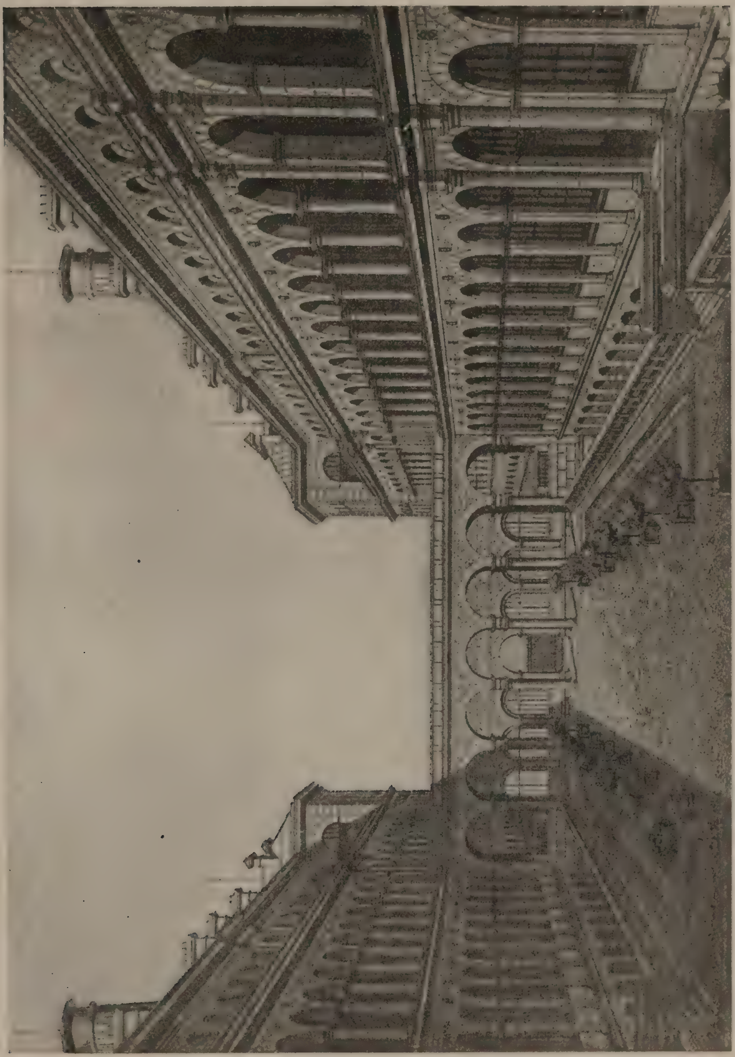


Fig. 7.—Hotel-Dieu—Central Court.

wards were given the form of an arch, the corners were rounded, and the walls oil-painted and polished. Frequent cleaning was thus rendered easy.

The proximity of the Seine allowed of all the drainage being led into it. The hospital was all the purer, but the Seine became so much the more contaminated.

What had been built was in part demolished; a large amount of money was expended, and yet, after all, the degree of perfection aimed at was by no means attained.

A short time afterwards, the various states of Europe, as well as France herself, enlightened by the results of the costly experiment made in Paris, applied themselves with contagious ardor to the reconstruction of their old hospitals and the erection of new ones, upon new models, profiting by all the mistakes committed, and in most cases transferring the new establishments to the country, beyond the centres of population.

It was in this way that the new hospital at Edinburg came to be erected. It is one of the most interesting that we could possibly show our readers.

The ground had a somewhat steep slope. This was not a drawback; on the contrary, it was an advantage for the drainage, and the architect turned it to good account. Over this irregularly shaped piece of ground the architect distributed ten principal buildings, several minor ones, and premises for the staff, with a court-yard in the middle. All the buildings, except those devoted to teaching, machinery, and the laundry, are connected with each other by passages, although they have large spaces between them planted with flowering shrubs. (See plan, Fig. 8). All these buildings are in the traditional Scotch style; gables in mingled brick and stone, and numerous square windows. The whole is an original example, albeit not the first one, of hospitals with detached buildings. As far back as the end of the last century this arrangement was applied at Plymouth (England). It has taken more than fifty years to become generally adopted. With the exception of Paris, where space is scarce and routine rules supreme, the system is now followed almost everywhere.

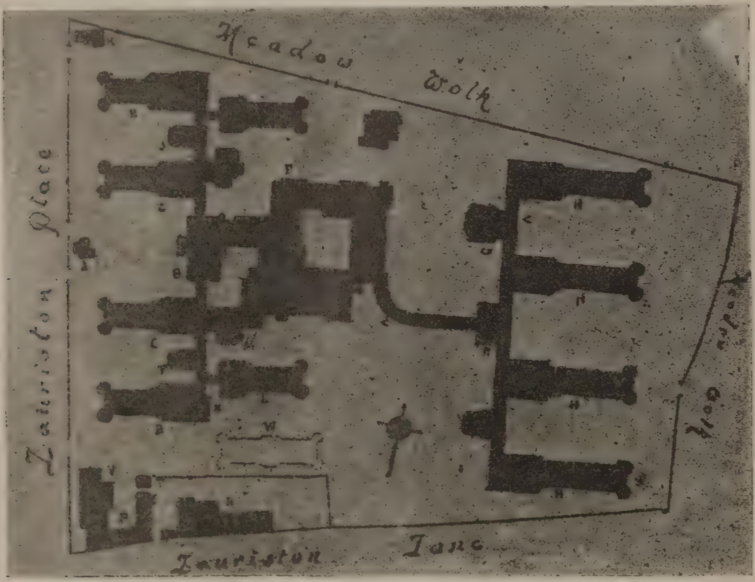


Fig. 8.—Royal Infirmary, Edinburg.

We are unable to point to any hospital in Great Britain as worthy of being copied. The finest in London is St. Thomas' Hospital, since its transfer to the right bank of the Thames. It presents to the river a long line of large buildings. They are very high, as it was necessary to economize space, and the wards are consequently superposed. This is the weak feature in all hospitals erected in the heart of populous districts (Fig. 9).

The Herbert Hospital at Woolwich shows us a better arrangement, although the ward buildings have two floors.

The Norwich Hospital is of imposing aspect, and the plan on which it is built has something to recommend it. At the ends of the buildings there are projections in the form of hexagonal towers.

The English hospitals are very carefully constructed. Their internal arrangements are excellent, the working is perfect, and every imaginable mechanical contrivance is utilized to facilitate the service. The architects have exercised all their skill and ingenuity to produce this result.

The Berlin Civil Hospital was constructed between 1866 and 1874, for the accommodation of 600 patients. The architects were Messrs. Gropius and Schmienden. It was wisely decided to erect it outside the city, in the Friedrichshain Park. Besides the chapel, the subsidiary buildings and the offices, it consists of ten distinct buildings, connected with each other by passages. In addition, there are two small buildings, in a corner of the ground, which are reserved for contagious cases. This is one of the most perfectly organized hospitals in existence. Fault, however, is found with it because the buildings have projections, which interfere with the circulation of the air, and exception is also taken to there being two floors of wards. We shall show further on that in the system of M. Tollet, the French engineer, these defects are avoided. The Berlin Hospital is in brick, which appears to be the most sanitary material that can be used. If it were possible, without too great an increase in the cost, to employ bricks that are glazed on one of their sides, the cleaning problem would be solved, as it would be easy to wash the outside walls almost daily. The heating is effected by means of hot water. The twelve pipes which supply each building pass underneath the floors and impart a portion of their heat by radiation. This is the principal object in the heating of hospitals.

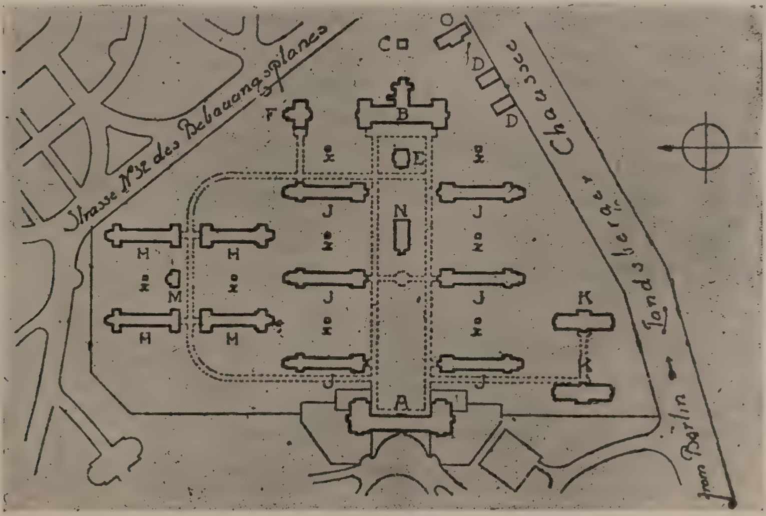


Fig. 10 —Civil Hospital—General Plan.

We think it will not be uninteresting to run over briefly the theoretic requirements which had to be complied with by the architects of the Berlin hospital in regard to heating and ventilation.

1. Every ward must be kept at a temperature variable at will between 15° and 18° Réaumur.

2. From 10° to 15° is sufficient for the doctors' and nurses' rooms, and 10° for the corridors and staircases.

3. The heat of the whole building must be central.

4. The heated air, upon reaching the wards, must not be at a temperature higher than 44° Réaumur.

5. The heated air must contain a proper quantity of moisture.

6. The patients must be able to warm themselves at any time, either at a stove or an open fire. (This condition does not seem to us particularly hygienic.)

7. The air of the wards must be renewed in all seasons at the rate of 100 cubic meters per hour and per bed. In case of need, it must be possible to change it at double this rate.

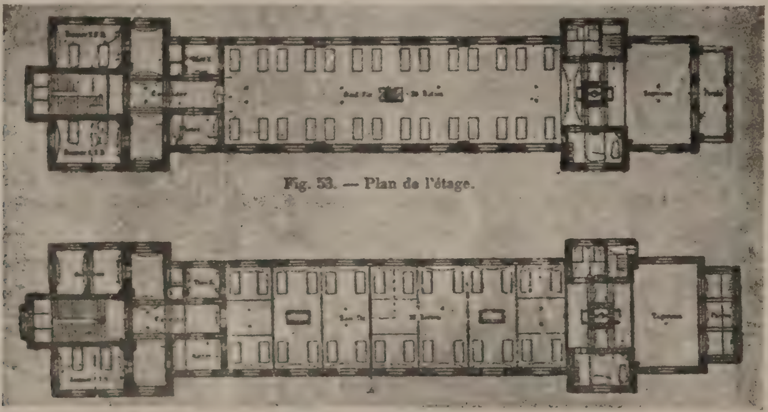
8. The fresh air must be admitted from the outside in such a way as not to inconvenience the patients.

9. The speed of the air at its points of entrance and exit must not exceed 60 centimeters per second, if the patients would be incommoded by the draught.

10. The gas-lighting must be so arranged as to assist the ventilation, and the products of combustion must be carried off.

11. The air-holes must not be in contact with the ground, etc.

In order to meet these conditions, the fresh air is brought into the wards through special pipes at about 5¼ feet above the floor, and the vitiated air is drawn downward by the effect of the heat radiated from below and passes out through gratings placed at the bottom of the lateral walls, behind each pair of beds. The open fireplaces complete the ventilation.



Figs. 11 and 11 a.—Hospital, Berlin—Floor Plan of a Pavilion.

The degree of heat required appears to us too high. It is much lower in French hospitals.

In order to abridge these details, we give here three plans, viz.: A general plan (Fig. 10); a plan of the basement of one of the buildings (Fig. 11), and a plan of the first floor of the same building (Fig. 11*a*). We also reproduce a section (Fig. 12) showing the form of the ceiling of the first floor. It will be observed that the angles are rounded, and that a slope is given to the ceiling in order to facilitate the ascension of the vitiated air. This indicates that the outlet through the gratings was considered insufficient.

The two buildings reserved for contagious diseases are specially interesting. We reproduce plans of the two upper floors and of the basement (Fig. 13, 13*a* and 13*b*). The reader will remark the nurses' rooms projecting from the centre of the posterior façade, and also below the level of the ground, the cellars where the heating apparatus is situated. The principal ward contains eight beds. Its width is 32 feet, and its superficial area 843 square feet, or say 105 square feet per bed. Its height is 16 feet 5 inches, and its capacity 520 cubic yards, or 65 cubic yards per bed. The small wards with two beds have an air space of 78 cubic yards.

The buildings face the west.

The objections brought against this establishment, and which we think are well founded, are: the superposition of the sick wards, and the angular projections which intercept the longitudinal circulation of the outside air. The edifice, however, is well constructed, the material used being an excellent kind of brick called Mettlach bricks, which have also been employed for the vaults, and for the paving in the contagious building. The walls are thick : the style of the decoration is severe. The hospital is surrounded by an open space of large extent.

The same architects, Messrs. Gropius and Schmienden, also constructed at Berlin, between 1873 and 1878, a military hospital to accommodate 510 sick or wounded. This also is located outside the city. We give a plan of it (Fig. 14) which shows that the system of detached buildings has been applied in the most thorough fashion. The principal wards have only sixteen beds, and the others six, three or two. The buildings cover nearly two-and-a-half acres, and the grounds are about fifty acres in extent. The air space per bed is about forty cubic yards on an averag The windows are double, and the whole edifice is built of brick. As in the civil hospital, there are rooms where the sick or injured can sit, play or converse, which is an innovation unknown as yet in most French hospitals.

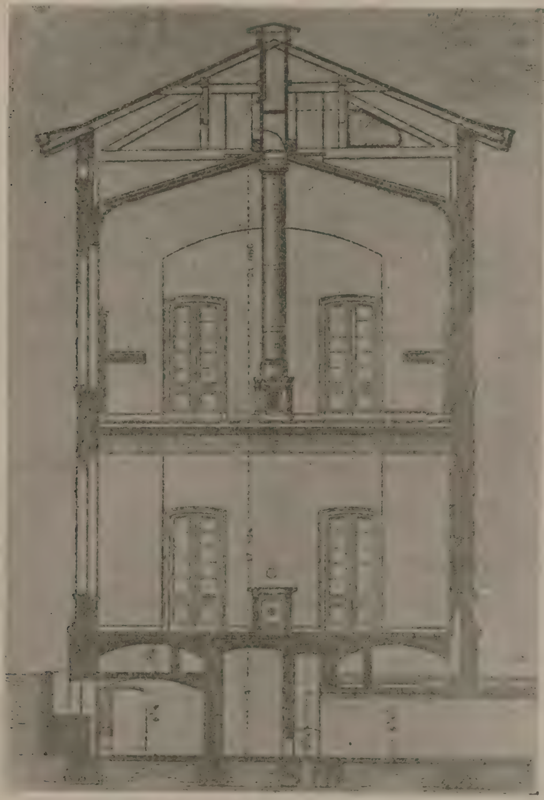


Fig. 12.—Hospital, Berlin—Transverse Section of a Pavilion.

In the Dresden hospital, which consists partly of old buildings and partly of new, there are verandas at the ends of the newly erected wards on to which, on fine days, nine beds can be wheeled, thus placing them practically in the open air.

The Heidelberg hospital, like those of Edinburg and Berlin, is composed of a number of detached buildings scattered over a large park, but connected with each other and with the administrative centre by covered passages.

The military hospitals at Konigs-

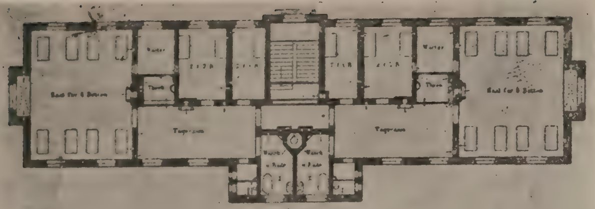


Fig. 56.

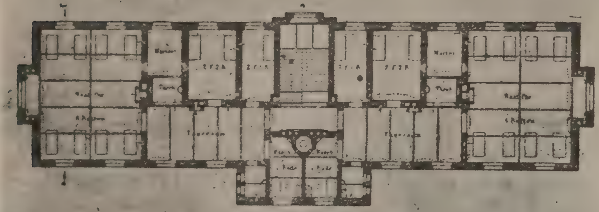
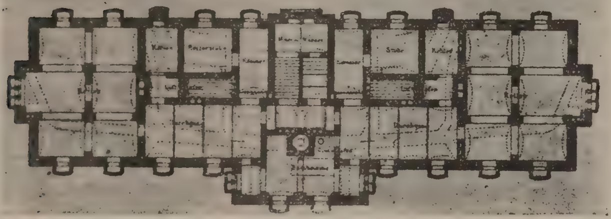


Fig. 57.



Figs. 13, 13 a and 13 b.—Hospital for Contagious Diseases, Berlin—Floor Plans.

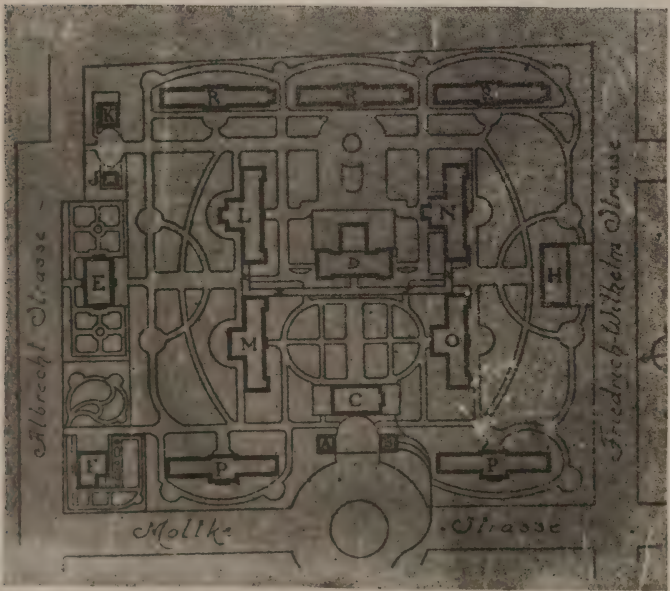
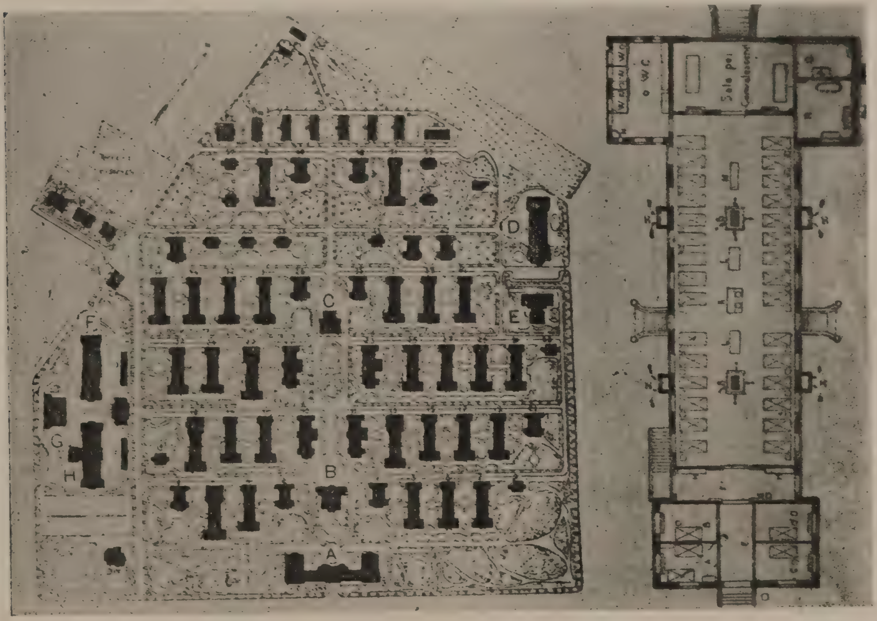


Fig. 14.—Military Hospital, Berlin.

berg and Custrin are laid out on the same plan, as indeed are all the new military hospitals in Germany.

The most curious of all German hospitals is the new civil hospital at Hamburg. The old general hospital, however great the talent displayed in its construction, had always been regarded as unhealthy. The mortality there, notwithstanding the most scrupulous cleanliness, reached 14.70 per cent, that is to say, 3.60 per cent more than obtains in the Paris hospitals. The new hospital at Hamburg is one of the largest in Europe. It has room for 1,500 beds, which is not conducive to salubrity. It covers, however, an area of nearly 45 acres, equal to 145 square yards per patient. It is situated about three miles north of the city. The buildings, generally speaking, face the southeast, which seems to be the best direction that could have been chosen. This hospital comprises 83 detached buildings, including 10 sheds for epidemic diseases. It contains 55 separate buildings for the accommodation of patients, all being built in brick and standing parallel to each other, and all of them having two projections at each end, which are not calculated to facilitate the circulation of the outside air. These buildings, as well as those for the service of the hospital, are connected by covered ways. In Figs. 15 and 15*a* we give the general plan and the plan of a patients' building. An excellent feature is that the wards consist of only one floor above the underground basement. This is not quite the ideal arrangement which, as we shall see, has been realized in a few French hospitals, but it is a notable improvement in German hospitals. The buildings form three series. Those of the first series are intended for 33 patients; those of the second series for 15, and those of the third series for six patients only. This division into large, medium and small buildings seems to have been adopted by the architect with a view of exciting the movement of the external air by varying the dimensions of the vertical surfaces. The most important improvement introduced into this hospital consists in the mode of heating.



Figs. 15 and 15a.—The New Hospital, Hamburg—Plan of a Pavilion.

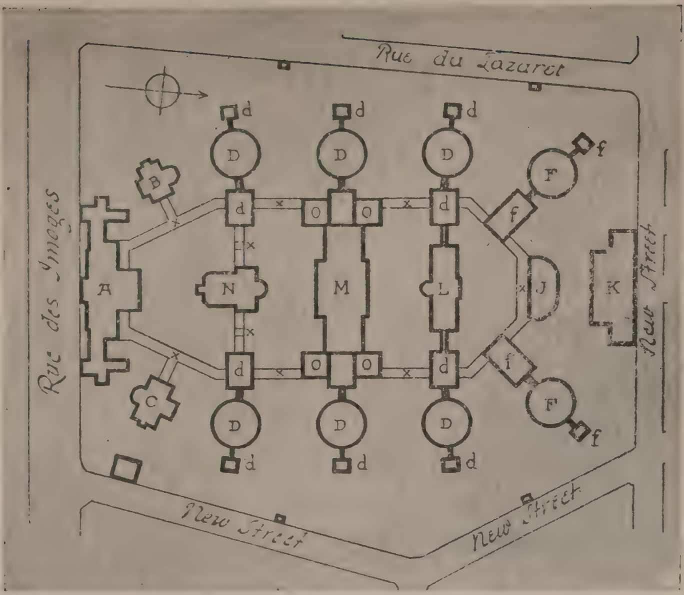


Fig. 16.—Hospital, Antwerp—General Plan.

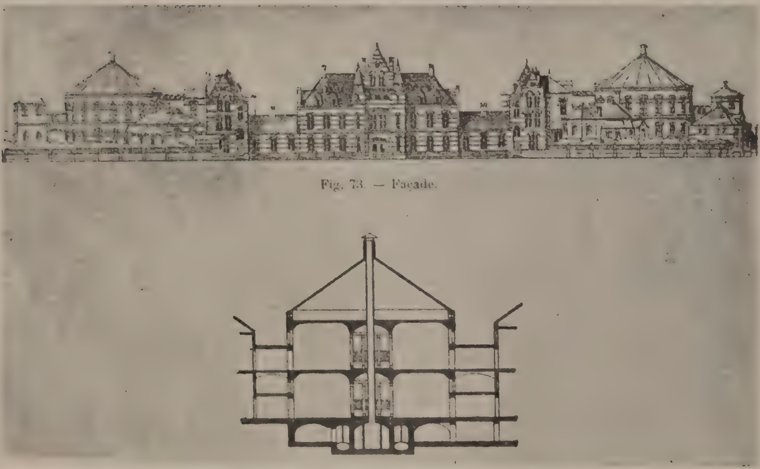


Fig. 73. — Façade.

Fig. 17.—Hospital, Antwerp—Principal Elevation

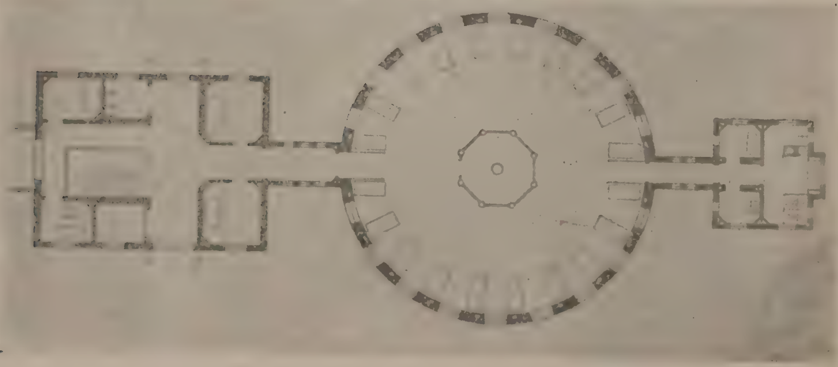


Fig. 18.—Hospital, Antwerp—Plan of a Hall.

This is effected by the circulation of steam through pipes placed beneath the mosaic floors, which are thus raised to a temperature of 20° Centigrade. It is, in fact, a trial on a large scale of the system of heating by radiation, which is the most wholesome of all, although not the cheapest. In spite of its great cost, it is to be hoped that this system will be applied to all hospitals built hereafter. Another improvement introduced in constructing this hospital consists in the use of eleven-inch bricks instead of wood for the sheds for epidemic diseases. Wood is inflammable, easily attacked by humidity, dilatable under the influence of the latter, and a congenial dwelling place for insects, microbes and rodents. When wooden hospitals have been in use for a considerable time, there is but one way of disinfecting them, namely, by burning them down, which operation is not always free from danger.

It is to be regretted that the architect of this hospital, which is planned and constructed with much care, should have been obliged to crowd the beds so close together, and should have placed the lavatories and water-closets in such near proximity to the sick wards. It would have been better to separate them from the wards by two doors.

In Belgium the hospital question has received great attention. Formerly, that country, with its dense population, had scarcely any but old hospitals; numerous, it is true, and noteworthy on account of their architecture and the many works of art that they contain. The new hospital at Ghent, which was erected in 1864 after the designs of M. Paul, marked a distinct step forward. The building has smooth walls, without projections at the ends, a single floor of beds, well-arranged offices, plenty of air, ample space, vaults to support the floors, numerous bath-rooms, sitting-rooms for the nurses and also for the doctors, hot-water heating system, steam engines and centrifugal ventilatiors [illegible] the air of the wards at 16° [illegible] Centigrade by means of a system of underground pipes. Since this hospital was opened, another has been built at Antwerp which may be considered as one of the most curious of its kind. We give its ground-plan (Fig. 16), face-plan (Fig. 17) and the plan of a ward (Fig. 18). The front is of a varied and original character. The architect has given play to his inventive powers while adhering closely to Flemish architecture of the last couple of centuries. He has enriched it with color by the use of stone and bricks. But it is in the plan that we find most originality. The references accompanying it sufficiently explain the purpose of each of the buildings. They cover 13,000 square yards, the ground covered by the whole hospital being 65,000 square yards, or say 26 acres. There is thus an area of 35 square yards per bed. This, however, is only apparent; if the area is calculated upon the wards occupied by the patients, it is found to be much less.

In France, the Renaissance converted the feudal tower of defense into a tower of ornament, as, for example, in the Château of Chambord. The Belgian architect has transformed it into a tower of charity. Is this transformation a wise one? It assuredly gives the whole edifice an air of originality which borders on singularity. This is perhaps one of the least qualities required in a hospital. On the other hand, if we compare the round form with the rectangular form of equal area, we find that twenty beds contained in the circular ward are separated from each other at the foot by only 5 feet 9 inches, whereas twenty beds contained in a rectangular ward would have a space of 7 feet between them. The circular form is consequently unfavorable to the spacing of the beds. Not only the capacity of the wards, but their ventilation also is inferior in a circular building. The sole advantage of these "towers of charity" in the general economy is that they allow of the separation of all the accessory rooms from the sick wards themselves. This is something, no doubt; but it seems to us that this system should be reserved for epidemics, and even then it would be necessary to place screens, so as to prevent the patients from seeing their fellow sufferers.

It was not without difficulty that the author of these very original designs, Mr. Baukelman, succeeded in getting them adopted. They have not been followed anywhere else.

As at Ghent, ventilation is obtained mechanically by insufflation. This method, which is based on that used in mines, has never given satisfaction.

The other accessory arrangements at the Antwerp hospital are of the most perfect character.

The total cost amounted to about 9,000 francs per bed.

There is nothing to be said in regard to Austrian hospitals, nor in regard to those of Switzerland, all of them being built according to old-fashioned plans, the point of departure of which is the Ospedale Maggiore of Milan, viz., buildings intersecting each other at right angles and enclosing vast court-yards ; two stories of wards, grouped around a central point containing the offices, the apartments of the staff, and a chapel whose belfry is usually the culminating feature of the edifice.

The system has also been followed in the erection of the numerous hospitals of the city of Paris, even the newest ones. There is, however, one remark to be made. The French government having been for the past fifteen years avowedly atheist, the chapels have been abolished, or at least closed. Those in course of construction were left unfinished, or else have been put to other uses. Offsprings of Christianity, the hospitals of Paris have repudiated their paternity and broken, in these latter days, the tie which bound them to the source of their existence.

Buda-Pesth, the capital of Hungary, possesses three new hospitals. St. Stephens' Hospital was opened in 1883. It comprises eight large detached buildings, premises for the staff, a chapel in the centre, and divers subsidiary edifices, the whole being spread over a superficial area of fifteen acres. It can accommodate 656 patients. A peculiarty of this hospital is that each building is alloted to a special class of disease. Its great defect is the superposition of the wards. The "Traders'" Hospital only covers 34,500 square yards of ground, the area built upon being 2,175 square yards. It was designed to hold sixty patients. The architecture is very simple, but evinces great care. The buildings have two stories. The one devoted to surgical operations is, in particular, arranged in the most complete manner and possesses every appliance that its purpose demands. The most curious of the three is St. Elizabeth's Hospital. It belongs to the Red Cross Society, which sufficiently indicates its use. It serves chiefly for wounded soldiers and as a special training school for nurses. There are, however, certain wards for the accommodation of civilians, and also for confinements. It occupies an elevated position on the right bank of the Danube, fifty yards above the level of the river, and is built on the detached system. The various buildings have only one floor above the basement ; in fact, several have only a ground floor resting upon underground cellars. A number of buildings still remain to be erected. St. Elizabeth's Hospital might be regarded as one of the best in existence were it not for the absence of connecting passages between the various buildings, which increases the work of the staff. Most of the wards contain from two to six beds. There are two large wards with room for thirty-four. The air space for each patient has been calculated at eighty-eight cubic yards. In the principal buildings each bed is computed to have cost 4,268 florins, while in the secondary ones the cost only amounts to 316.60 florins. In consideration of its twofold character of hospital and training school, we give here a bird's-eye view of this institution (Fig. 19).

To the examples already given we will add the Copenhagen Hospital. The subjoined perspective view (Fig. 20) will suffice to convey an idea of its general scheme. It will be observed that the architecture of the detached buildings is extremely simple. The buildings have only one floor.

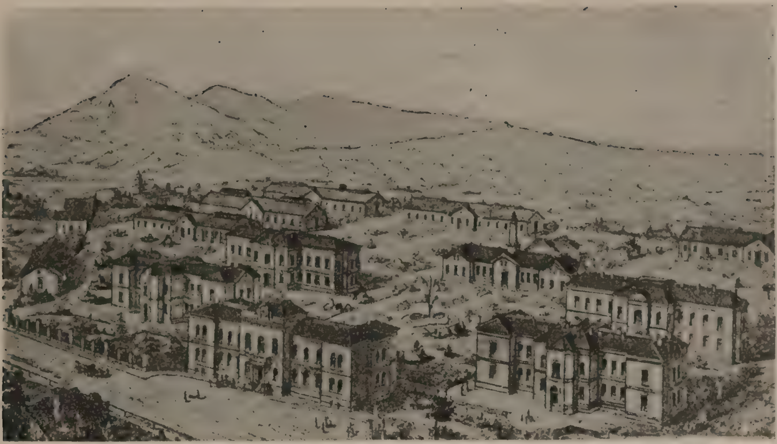


Fig. 19.—St. Elizabeth Hospital, Buda-Pesth.

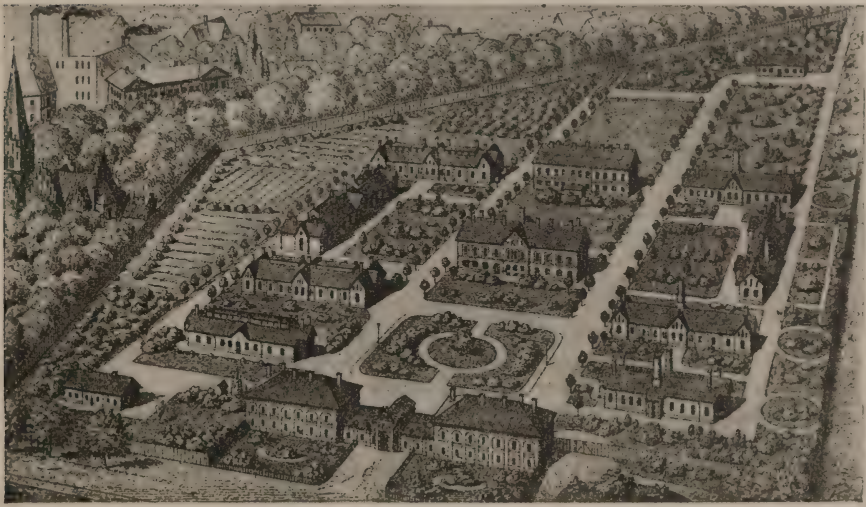


Fig. 20.—Hospital, Copenhagen—Perspective View.

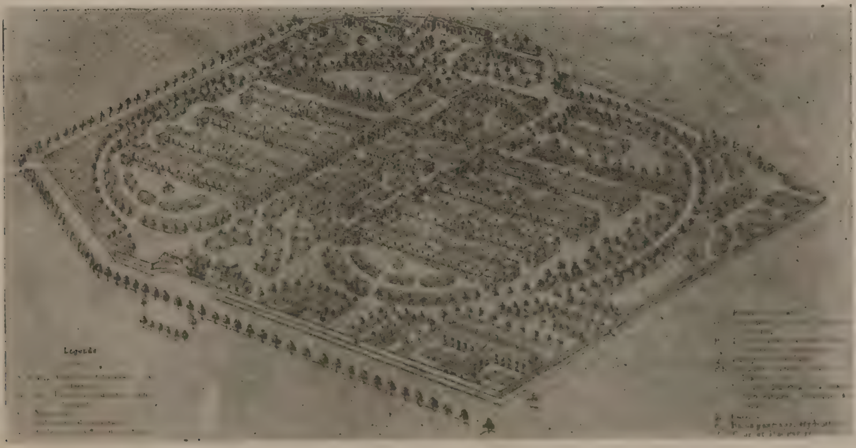


Fig. 21.—Civil and Military Hospital, Montpellier—Birdseye View.

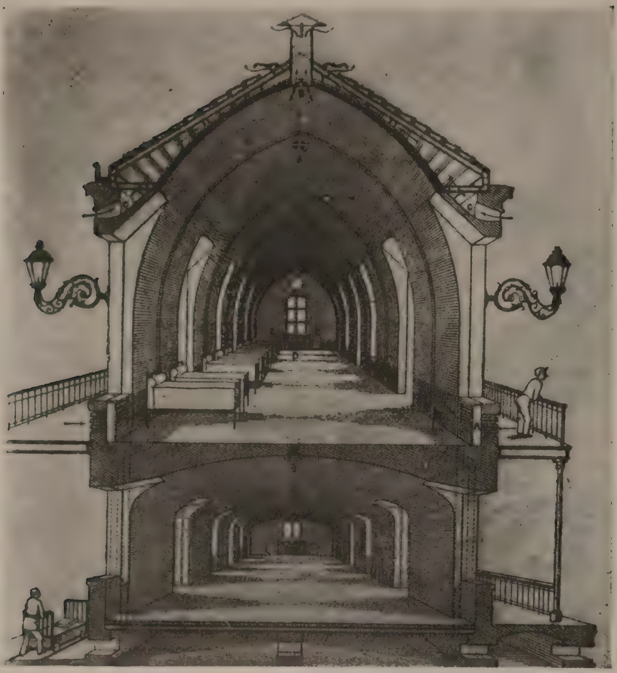


Fig. 23.—Hospital, Montpellier—Transverse Section of a Pavilion.

removal of the vitiated air is effected in two ways; by draught-chimneys in some buildings, and in the others by a kind of fan (reuterdack) consisting of glass plates worked by motive power. It is calculated that the air is changed at the rate of 148 cubic yards hourly per head. The various buildings have no connecting passages. This hospital is reserved exclusively for epidemic and contagious diseases. Apart from the Leper houses of the Middle Ages and the Lazarettos, it is the first establishment of this kind founded in Europe.

Russia has paid a great deal of attention to the matter of her hospitals. Moscow has two, which would be models of architecture and intelligent arrangement if they had not been planned according to the old-fashioned systems of agglomeration and of buildings intersecting each other at right angles. The Baschruschin Hospital presents a handsome façade, above which gleams one of those oriental campaniles with small globe, the original form of which has been made familiar to everybody by pictures of the Kremlin. But in addition to this civil hospital Moscow possesses another, exclusively military, which is unique of its kind. The buildings composing it have nothing remarkable about them, but in summer time these edifices are emptied and the sick or wounded inmates transferred to tents erected in an immense and well-wooded park, redolent of resinous odors. This open-air treatment has given such excellent results that it has been extended to most of the military hospitals of Russia—those at Riga, St. Petersburg, etc.—but for tents, wooden huts have been substituted. They can thus be used in winter. We shall show further on that M. Tollet, the French engineer already referred to, has replaced these wooden huts by sheds in brick and iron, the use of which materials does away with the defects of the wooden huts without diminishing their advantages.

Generally speaking, the newest hospitals in Germany and the North of Europe present the plan of a quadrila-

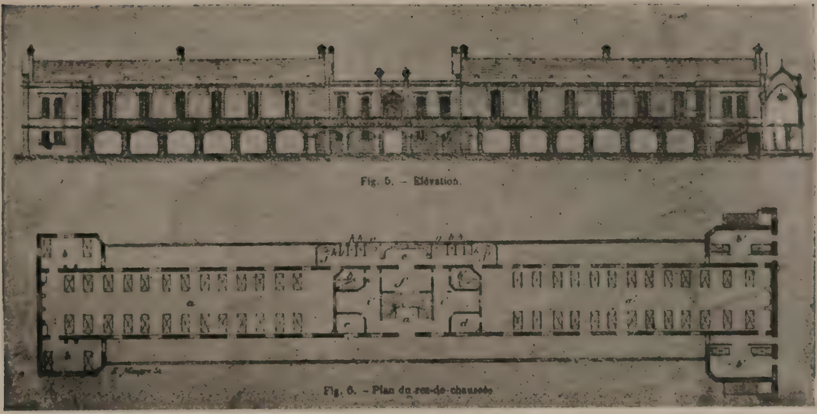


Fig. 24.—Hospital, Montpellier—Elevation of a Pavilion.

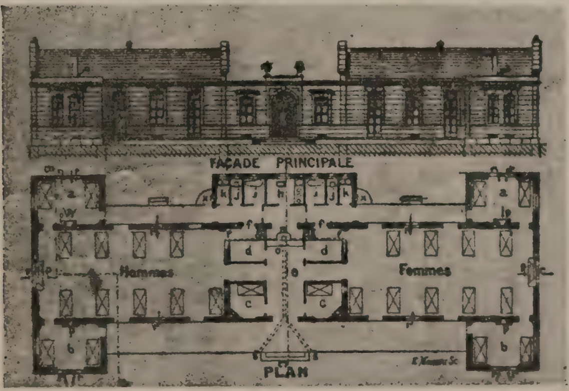


Fig. 25.—Montpellier—Hospital for Contagious Diseases.

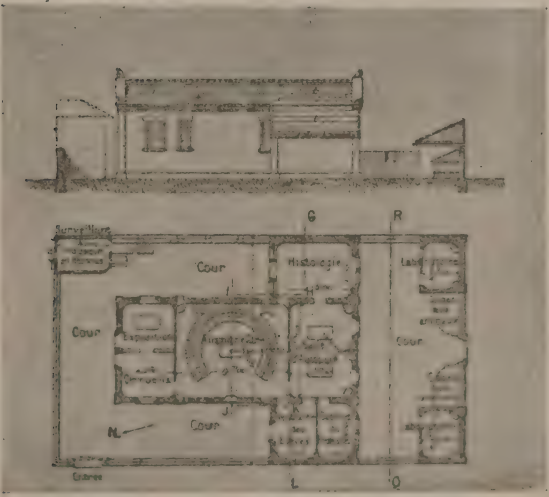


Fig. 26.—Hospital, Montpellier—Plan and Elevation of the Autopsy Pavilion.

teral, open in front. Their regular and symmetrical distribution gives them an appearance which is imposing but dull. The wards are numerous and contain from two to thirty beds each. For protection from cold, the connecting passages form part of the body of the edifice. This arrangement, however, must tend to the propagation of disease. The ventilation is in many cases imperfect, and there is an insufficiency of light. The wards are often superposed, and have low ceilings. The narrow court-yards keep in the heat, but do not facilitate the circulation of air.

In hot countries the conditions are totally different. In Italy great progress has been made. To many old hospitals detached buildings have been added, consisting of a single floor and connected by exterior passages. The Broni Hospital, which was inaugurated in 1893, is formed of a long central gallery, to which are joined, on each side, at right angles, a series of four buildings. First comes that containing the offices and the premises for the staff, divided into two parts; then four sick wards, and, lastly, the servants' quarters on one side and the building for contagious diseases on the other. Between the two is the chapel. All these buildings are separated by large flower beds, unenclosed at their outer end. This arrangement, in spite of its relative superiority over old systems, is not altogether perfect.

In Spain and Portugal the greater number of the hospitals are located in old religious edifices. At Madrid, however, a new hospital is being erected after the system named after M. Tollet.

The City of St. Petersburg has started on the road of progress by putting into practice a general principle which ought to be adopted in every great city of the world. No more big hospitals within the city limits, but only depots for urgent cases, the patients being removed to large establishments advantageously located in the country. This is an excellent system for the patients, but it is one which is very inconvenient for the doctors, who have to leave their *clientele* and take long trips out of town. It would be particularly awkward in Paris, where the means of locomotion are slow and inadequate, and where, too, the leading medical men often divide their time between lecturing, attending their wealthy patients and giving consultations. The evil would not be greater if the lecturing and practising were divided among a larger number of doctors, of whom there are so many who lack neither knowledge nor earnestness. The means of rapid locomotion tend to increase around populous centres, and even in the outskirts of Paris, crowded and ill-served as they are, healthy spots can be found, spacious enough for the establishment of parks where hospitals could be properly isolated. Under the Second Empire, as also under the old Monarchy, efforts were made to transfer the hospitals beyond the city.

The Salpêtrière Hospital, which was built in the seventeenth century, constitutes the largest establishment of the kind in Europe. It has room for 6,000 beds, which is an agglomeration out of all proportion to its present central situation. At the time it was founded, fields surrounded it on all sides.

The Bicêtre Hospital is, so far, still in the open country. It was caused to be erected by Louis XIII. upon the site of an ancient castle. This hospital was the first one ever built for disabled soldiers. Since the construction of the Hôtel des Invalides by Louis XIV., the Bicêtre Hospital has, however, been a part of the general hospital service of Paris, and has been turned into an asylum for the aged and the insane. It contains no less than 2,800 beds, which is far too great a number to be collected in one place.

The Second Empire, in its turn, transferred beyond the city various charitable foundations, such as the "Incurables," the "Petits Ménages" and the "Sainte-Sérine," admission to the last-named of which has to be paid for. If the revenues and endowments of the "Assistance Publique" were not deviated in part from their true destination by political exigencies, or absorbed by unnecessary expenses, Paris would be able in a few years to imitate Saint-Petersburg and transport her hospitals from the heart of the city to a distance of four or five miles into the country, utilizing the old buildings merely as depots and consulting rooms.

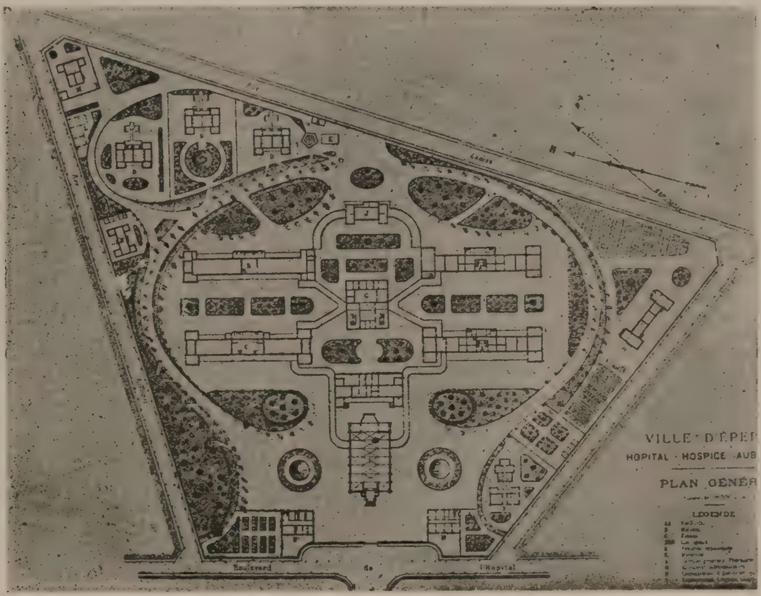


Fig. 27.—Hospital, Epernay.

We have now come to the very kernel of our subject, and will deal with the hospitals most recently constructed in France. These embody all the improvements introduced into hospital architecture during the last quarter of a century. The type adopted represents an entirely new system. We do not mean to say that all the elements are new. We have shown that the idea of detached buildings dates from the last century and that it has been put into practice in the construction of nearly all the hospitals erected in Europe within thirty or forty years. This system would be incomplete if it did not rest upon a series of applied hygienic principles which have been, so to speak, established and codified by experience. The first of these principles is that every future hospital shall be placed on ground that is permeable, easily drained, in an open situation and provided with good potable water. The area of the ground should increase progressively with the number of patients provided for. Thus, for 100 patients, 120 square yards per patient may be sufficient, while for 600 patients 175 square yards per patient are necessary, which is equivalent to saying that for a hospital intended to accommodate 600 patients, 22 acres, or say 108,000 square yards, are required. It is evidently well-nigh impossible to find pieces of ground of this extent in cities, and the consequence, therefore, of such a principle is to relegate large hospitals to a distance from populous places. The various buildings should not be large. They ought to have only one floor; they should not contain more than 50 patients each, and should be divided into wards accommodating from two to twenty patients each. There should be day wards and night wards, so as to allow of a complete change of air. The air space in the wards ought to be increased progressively with the number of beds. There should be 52 cubic yards for two beds, and 85 cubic yards for each pair of beds if there are twenty beds in the ward. The sick or injured should be divided into classes of maladies, as is already done in a few new hospitals, among others in St. Stephen's Hospital, Buda Pesth. Of course, the buildings containing the laundry, kitchen, etc., must be at a distance from the sick wards, and the same remark applies also to the apartments of the doctors and the hospital staff. The various buildings should be well spread over the ground, but it should at the same time be easy to pass from one to another. An important matter is that of the point of the compass which the buildings should face. This can only be settled on the spot, after the usual direction of the wind has been ascertained. A good rule is to profit by the wind for the carrying away of all miasmas. To facilitate this work of nature it is desirable that the outside walls should have a smooth surface, and there should be no parts jutting out from the main block; for instance, no wings at a right angle. The artistic effect may suffer, but the result from a sanitary point of view will be an ample compensation.

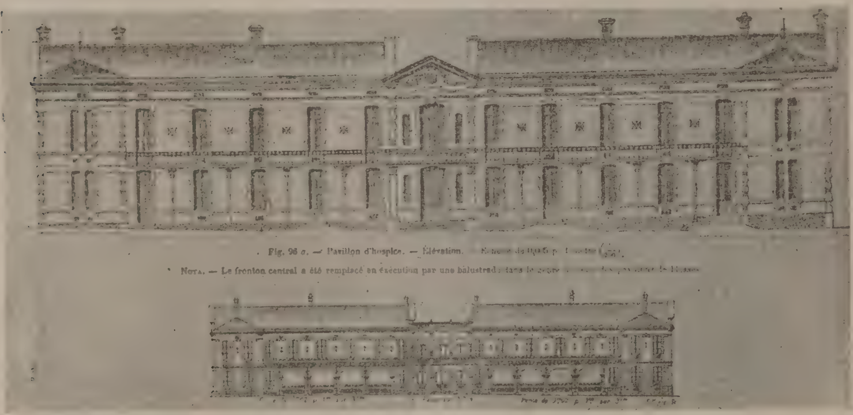


Fig. 98 a. — Pavillon d'hospice. — Élévation.
Nota. — Le fronton central a été remplacé en exécution par une balustrade

Fig. 28.—Hospital, Epernay—Elevation of a Pavilion.

Inside, this rule as to smooth surfaces is still more imperative. It has already been followed in several modern hospitals by rounding off all the corners, covering the walls with a paint, called enamel paint, which makes a polished surface, and also by reviving the pointed-arch style of ceiling, of which such judicious use was made in the Middle Ages, from the twelfth to the seventeenth century. This ceiling question is very important. The use of iron simplifies it. In these days, when the germ theory of disease has made such remarkable progress, hospital architecture must adapt itself to the laws laid down by hygienic science. To drive into the upper parts of the infected wards all those tiny atoms, ambiant and invisible, which propagate disease; force them to depart thence into the open air without giving them a chance of hanging on to any ledge or projecting point—such ought to be the architect's principal aim. The ogival form is the one that most facilitates the expulsion of these dangerous guests. Experience has also taught that, to attain this result, nothing should be tolerated on the ground floor, beneath the sick wards, except open galleries, freely swept by currents of air, while above, in the attics, there must be the most complete ventilation, unimpeded either by partitions, store-rooms or sleeping apartments.

The architect's precautions should

go further still. The choice of building materials is of great importance. Well-burnt bricks are better than anything else. It requires ten years for a wall built of Paris limestone to become thoroughly dry, and it always gives passage to the air. Bricks, vitrified or nearly so, are always dry. Mortar joints are not so, but if proper cement is used the walls will be dry within a year. In every European country bricks are now made having one of their sides glazed like earthenware. Those are the most suitable material for the exterior walls. The fire-hose can then make short work of all the microbes that may have taken lodgings there. Any diminution in the average death rate, however slight, would be a full reward for the extra outlay.

We have by no means enumerated all the improvements that ought to be effected in hospital construction. The foregoing outline of them was necessary in order to make clear the ideas which have guided M. Tollet in the erection of some hospitals that may be cited as models. I ought to mention one other point. A hospital should be bright; it should not wear the air of a prison. Architectural relief and ornamentation being practically precluded, we must fall back on coloration. With enameled bricks nothing is easier than to produce coloration of a light and varied character. But this is a detail which we need not dwell upon at length here.

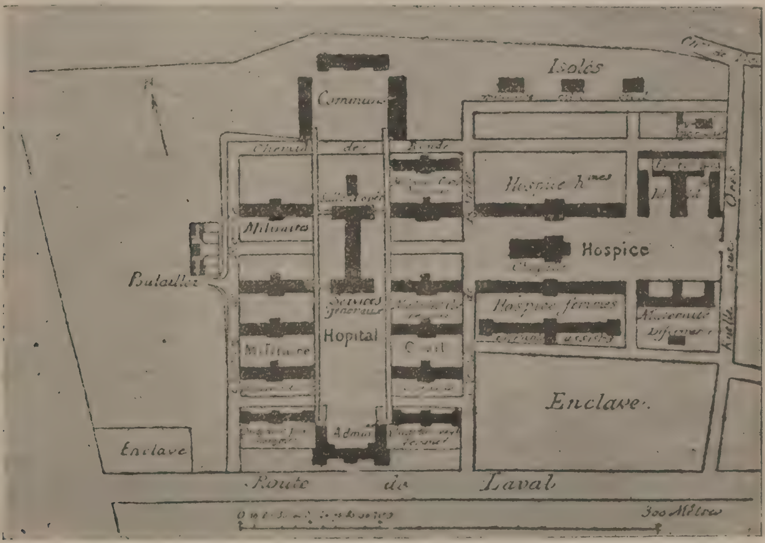


Fig. 29.—Hospital, Le Mans—General Plan.

The first application of the Tollet system was made in the erection of the military hospital at Bourges, although it had been utilized previously for a few barracks. The Bourges hospital is situated in a healthy spot quite in the country. It faces the south-west, and was planned to contain 260 beds. The area of the ground is 57,400 square yards, or 265 square yards per patient. The area built upon is 6,000 square yards, and the cost of erection amounted to 22 francs per square yard. The collective wards contain 28 beds each. Each bed occupies a space of 9 square yards, and has an air space of 63 cubic yards. All the conditions proposed by M. Tollet have not by any means been carried into effect, yet the result has been such that the Bichat Hospital, in Paris, which is a branch of the Hôtel-Dieu, has copied some of the essential features of the structure of Bourges. This little hospital, fomerly an old barracks, is of all the hospitals of the great capital the one where the mortality is lowest. But as it still belongs, owing to its plan, to the ancient system of parallel buildings surrounding a court-yard enclosed on three sides, we think it preferable to cite the civil and military hospital at Montpellier, where the Tollet system has been applied in its entirety. At Montpellier we still meet with parallel buildings, it is true, but they are so placed as to facilitate the natural airing of the gardens which separate them. The enclosure itself presents the aspect of a garden (Fig. 21). This hospital is located outside the town and faces in such a direction that the morbid emanations are never carried citywards. The grounds cover 22 acres, and the edifice has room for 610 beds. The ward buildings are of one uniform type, with only a single floor, and are raised about 12 feet above the ground on a series of elliptical arches supporting a floor in brick and iron. These arches are occupied only at either end, and there is a free circulation of air over two-thirds of their surface. The open part in the centre, 240 square yards in area, serves as a covered court-yard and promenade. In war time it could accommodate the wounded, if it were closed in with canvas or glass. Fig. No. 22 is a reproduction of the face plan of one of these buildings. It shows also the lateral galleries for the accommodation of the attendants. The section (Fig. 23) conveys a good idea of the value of the system. Below, the open, arched gallery, and above, the ogival-shaped ward, with ventilator and chimney for the escape of the vitiated air. To complete the picture, we give the plan of a sick ward (Fig. 24) where, according to needs, either one or two rows of beds can be placed; plan and front view of the building for contagious cases (Fig. 25), and plan and lateral elevation of the building containing the dissecting and lecture rooms (Fig. 26).

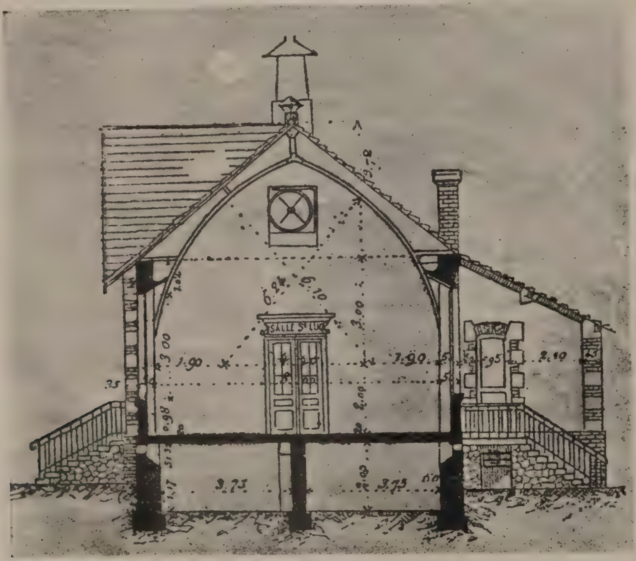


Fig. 30.—Hospital, Le Mans—Lower Section of a Hall.

The Montpellier Hospital is an annex of the Paris School of Medicine and Surgery. There has been added a maternity section, with special infirmary, court-yards and gardens, and a separate entrance. In the construction of these the same principles have been followed.

Finally, the subsidiary buildings are connected one with another and with the ward buildings by covered passages, where the air is always kept fresh.

The total area covered by all the buildings amounts to 15,850 square yards, or about 23 square yards per patient, being almost double the space they occupy in their wards. The floor area of the wards in use may be estimated at 21,500 square yards, or nearly 36 square yards per patient. There are, besides, 92,000 square yards of court-yards and gardens, or 150 per head. The cost, including the price of the ground, was 2,250,000 francs, being 165 francs per square yard of buildings, say 3,680 francs per patient.

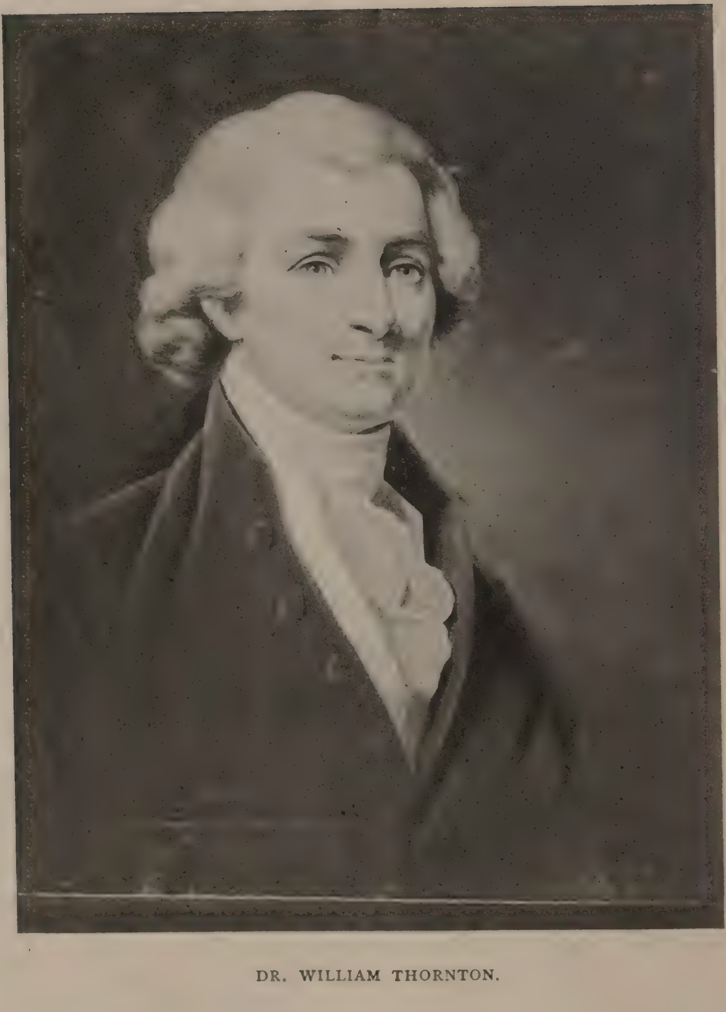
In the official report of the Universal Exposition of 1889 we find the following lines:

> "In the place of buildings consisting of several floors, which offer great disadvantages, as they facilitate the dissemination of morbid germs and the propagation of certain diseases, there have been substituted detached edifices, either isolated altogether one from another or united together by passages, and containing only a limited number of beds. These ideas are at length being carried into practical effect. The authorities have thought fit to draw attention to them in a special manner by placing before the eyes of the public, near the entrance to the Exposition, a plan of the new civil and military hospital at Montpellier, which is, above all other establishments of the kind, the one where these ideas have been most thoroughly worked out in accordance with the plans of M. Tollet, the engineer."

Since that time the same system has been utilized for the new hospitals at Saint Denis, Hâvre, the St. Jacques Hospital, Paris, the Auban-Moët Hospital and Almshouse at Epernay (Fig. 27 and 28), the hospital at Le Mans (Figs. 29 and 30), the one at Bône, Algeria, and the Hospital of San Juan de Dios at Madrid, which contains no fewer than 800 beds.

Various improvements as regards matters of detail have been made in constructing these hospitals, but the essential features of the system remain unchanged. Its value has now been proved by experience.

Alphonse de Calonne.



DR. WILLIAM THORNTON.

DR. WILLIAM THORNTON, ARCHITECT.

THE architects connected with the early development of Washington were men of interesting personality and architectural talent.

Dr. William Thornton, a West Indian, was one of the first as well as one of the most interesting of these pioneers of the profession.

His family were prominent among the Friends in England. His parents moved to the Island of Tortola, in the West Indies, in 1761. Here Thornton was born May 27th of the same year. At this period either Thornton's father or uncle was Governor of the Island.

When five years old Thornton was sent to England to be educated. He studied medicine under Dr. Feld, then with the noted Dr. Brown of Edinburgh. In that city he graduated in medicine in 1784. His studies were continued in Paris.

In the latter city an intimate friendship was formed with the noted Countess Beauharnais, a relative of Empress Josephine's first husband. She was an authoress and held a famous salon.

Thornton traveled extensively on the continent of Europe with Count Audriani, the naturalist. After which he came to this country and formed a temporary residence in Philadelphia.

In 1790 he married the daughter of Mrs. Ann Brodeau, a successful school teacher of Philadelphia. Mrs. Thornton, who was born in England, was a lady of culture, and an artist of some ability, which is proved by a miniature of her husband in the possession of Mrs. Kennon. After their marriage they returned to Tortola, where Thornton had an interest in the estate of his father.

In 1793 he moved to Washington city, where he lived until his death, in 1828. He left no children.

He found it necessary to take a house in Georgetown. Some years afterwards he moved to 1331 F Street, opposite the present Ebbitt house. At this place he and James Madison were neighbors for eight years.

Benj. Ogle Tayloe says: [*]"He had a well-earned reputation for letters and taste; . . . he was a wit, a painter and a poet." Dunlap,[†] whose work was published only a short time after Thornton's death, says: "He was a scholar and a gentleman, full of talent and eccentricity,a Quaker, by profession a painter, a poet and well acquainted with the mechanics, arts; his company was a complete antidote to dulness."

Thornton's duties brought him into close relation with such eminent men of his day as Washington, Madison, Jefferson, Randolph, L'Enfant, Adams, Hamilton and Fulton. He was intimate socially with the Tayloes, Carrolls, Stuarts, Van Nesses, and others who were the features of political and social life at the federal capital in those days.

The acquaintance with Washington ripened into such an intimacy that his home was the president's familiar resort when in the federal city.

The "National Intelligencer," of March 29th, 1828, as well as the Columbian Institute and the Colonization Societies in memorials on his death, pay a high tribute to his ability good fellowship and philanthropy.

The American Philosophical Society[‡] conferred the Magellanic gold medal upon him in Dec. 1792, as a distinction for his book on written languages.

As an author he wrote a treatise on the elements of written language, which was published in Philadelphia, in 1793, under the title of Cadmus. There is an extended review of Cadmus in the "Monthly Review" of the date, as well as a note in reference to an article on teaching the dumb.

He published papers on medicine,

---

[*] In Memoriam Tayloe, p. 98.

[†] Dunlap, "Art and Design," N. Y., 1834.

[‡] Trans. American Philos. Society.

astronomy, philosophy, finance, government and art as well as on language.

According to the "Science Record," in June, 1810, he published a long defence of Fitch as the inventor of the application of steam to navigation. This pamphlet was reprinted in the Patent Office Record, in 1850, and is considered an official document of value.

As an inventor he claimed, according to Tayloe, to be the first to apply steam to boat propulsion. He was associated with Fitch in his experiments on the Delaware before Fulton commenced his on the Hudson.

Brissot describes Fitch running a boat from Philadelphia to Trenton in 1789 by steam and notes the fact that thousands witnessed the event.

In his pamphlet (1810) Thornton claims that Fulton was indebted to him for valuable suggestions, as Fulton saw Thornton's drawings when he visited the patent office in 1806. As early as 1788 Rumsey applied for a patent on steamboats, which conflicted with the invention of Fitch. This was proved by Fitch winning the case. Fulton's first patent was not issued until 1809.

Thornton claimed that Fulton's death was due to worry caused by the strength of his pamphlet. While in America the first time Thornton was engaged to build steamboats to navigate the Mississippi (before 1790). This scheme fell through for lack of financial aid. Thornton seems to have had greater faith in the future of steamboats than Fulton, who offered to bet the former that a boat could never go more than 5 miles an hour, while Thornton expected a speed of 12 miles.

Another invention which has recently been revived was the conversion of sawdust into planks.

Thornton received patents for improvements in steamboats, steam-boilers and condensers. Fernando Fairfax gave him £2,000 for a quarter interest in his patents and manufacturing companies.

As an artist, Thornton was more than an amateur. Tayloe mentions a head of Jefferson, by King, as a copy of a painting by Thornton, and Mrs. Kennon, at present the owner of Tudor house, in Georgetown, who knew Thornton in her childhood,has a miniature of Washington painted by him. Mr. Charles Hoffman, of Frederick, Md., and Mrs, Miller, of Washington, have pieces of his work, among them being a portrait of the Countess of Beauharnais.

He was noted for both philanthropy and bravery. Brissot says: "From conversations with Thornton, although his exterior denotes not the Quaker, yet he professes their principles and practices their morality." *Brissot gives quite a lengthy account of Thornton's efforts to colonize the negroes in Africa; he went to the expense of sending an agent to Africa to locate a colony. Unfortunately,this vast scheme was not accomplished. He became actively interested in negro colonization as early as 1789, and was until his death a member of the American Colonization Society.

When the British captured Washington, in 1814, an officer ordered a gun turned on the Patent Office Building. Thornton rode up and jumped off his horse in front of the gun demanding: "Are you Englishmen or Goths and Vandals? This is the Patent Office, the depository of the inventive genius of America, in which the whole civilized world is concerned. Would you destroy it? If so, fire away and let the charge pass through my body."† By this effort the patent records were saved. Thornton carried the Patent Office records to his farm in the country, so that none were lost. He also placed a guard at the navy yard and capitol during the evacuation.‡

Several instances are on record where in attempting to protect a wife from a brutal husband he, in turn, found it necessary to defend himself against both wife and husband.

Among his papers are his commission as Lieut-Captain in the War of 1812.

One of his most intimate friends was John Tayloe, the owner of the

---

*Brissot, Citoyen Francais, Vol. I, p. 245. From note in Toner collection

†The Patent System of the United States, by L. H. Campbell.

‡Private letter.

Octagon house, probably the most noted producer of race horses in this country. Thornton also kept and raised race horses. He imported fine animals from Barbary and England. His account books show quite a number of blooded stock that are valued at more than $2,000 apiece. By horses and benevolence he is said to have lost large sums of money.

There are three things that connect Thornton intimately with the history of Washington city and the country, and where the excellent character of his work places the people under obligation to him.

First, for his artistic capacity and skill in producing the best scheme for a capitol, which forms the nucleus of the present structure. Second, for his general culture, breadth and capacity as one of the Commissioners of the District, which is shown in the execution of the magnificent ideas of Washington and l'Enfant as to streets, his own and Hoban's ideas as to public buildings and grounds. Third, for his mechanical knowledge and executive ability. The Patent Office, which has fostered and encouraged the inventive ability of the country began under his management.

THORNTON AS A COMMISSIONER OF THE DISTRICT OF COLUMBIA.

The Superintendent of Public Buildings and Grounds has quite a number of volumes, embracing early letters concerning the formation of the District of Columbia, the laying out of Washington City, and the erection of the Federal Buildings, as well as a complete record of the proceedings of the Commissioners, from 1792 to 1802.

The history of Thornton's connection with the City and Public Buildings is to be found in these volumes and in letters in the possession of private parties.

By act of Congress, Jan. 4th, 1790, the President was authorized to appoint a commission to survey the District, purchase, adopt and lay out a plan for the Federal City, and prior to the "1st Monday in December 1800, they were to provide suitable buildings for the accommodation of Congress, the President and the public offices of the United States Government." All their work was subject to the approval of President Washington.

[*]The first commissioners appointed, Jan. 22d, 1891, were Thomas Johnson and David Carroll, of Marvland, and David Stuart, of Virginia.

On Sept. 16th, 1794, Thornton received this commission from President Washington: . . . "I hereby appoint said Wm. Thornton one of the Commissioners for surveying the District of Territory accepted . . . for the permanent seat of the Government of the United States, . . . with all authority to proceed according to law.

"Given 12th day of Sept., 1794, of the Independence of the United States the Nineteenth."

"George Washington,
"by Edw. Randolph."

There is nothing in the records to show the time that the Commissioners were expected to devote to their duties. This matter was probably left to their own judgment, and they must have had considerable time to attend to private business.

The salary of a Commissioner was sixteen hundred dollars per annum. After Thornton became a member of the board of commissioners, a decided improvement is evident in their written proceedings and in the business forms and contracts which were introduced in connection with the streets, bridges and buildings that were in their charge. As they appear in the records after his appointment, Thornton should have the credit for the improvement.

The ability of Thornton was appreciated by his contemporaries.

Andrew Ellicott, who was doing the field work in laying out the city, sent a letter rejoicing in Thornton's appointment for the good of the streets and buildings, saying: "The former commissioners were totally ignorant and an easy prey." He warns Thornton to be on his guard. Washington, before retiring from the Presidency, says: [†]"I think the United States are interested in the continuance of you in the service, therefore I should regret if either of you (Thornton, Scott or White), by resignation should deprive them of assistance which I believe you are able to give."

---

[*] Proceedings of Commissioners, 1791, Vol —, p 2.

[†] Old letters. Feb. 27th, 1797

Thornton's education and disposition caused him to take an active part in all the duties of the commissioners, which consisted in supervising the surveys for the District boundary, the streets of the city and the subdivision of the squares into lots and the location of Federal buildings. The preparation of maps and their reproductions, obtaining plans for the Federal and the arrangements for temporary buildings and bridges, laying out grounds, the opening of quarries, brickyards and kilns, lime-kilns, the cutting of lumber, and the obtaining workmen for brickmaking, quarrying, stone-cutting, as well as brick and stone masons, carpenters and laborers.

Workmen, at this period, were obtained by advertisement and negotiation from England, Scotland, France and different parts of this country.

The commissioners let all contracts and supervised the foremen who obtained the material from the quarry, kiln or forest, and who superintended the work on streets, buildings or bridges. In all cases we find Thornton insisting on the necessary grandeur of scale. He puts himself frequently on record as opposed to some of the narrower views of other members of the board.

*The commissioners, on July 20th, 1795, made building regulations for the city. It would be fair to assume that Thornton, being the architect on the commission, was the prime mover and preparer of these regulations.

The commissioners obtained and disbursed money, bills for even the most trifling objects being submitted for their approval. They attended to the sale and other negotiations in the connection of transfers of lots.

Thornton was delegated to negotiate a loan in Philadelphia and another later on in England. In both cases he was successful.

In answer to a letter from Washington concerning a National University, two commissioners write, Feb. 18th, 1797: "Dr. Thornton has long had in contemplation to lay before the executive such a one."

In 1801 the Commissioners of the District became offended at some report of Congress which reflected upon their management. By request, a committee of Congress examined their accounts and it was proved that the commissioners had served with perfect integrity.

An act, May 1st, 1802, abolished the office of the commissioners, their principal duties being complete, and the President appointed Thomas Monroe to perform a part of the duties of the commissioner.

THORNTON AS AN ARCHITECT.

He early displayed a talent for drawing. When a lad at school in England, he showed his uncle two five-pound notes, asking him to select the one which was best engraved; this proved to be the one young Thornton had just copied in pen and ink.*

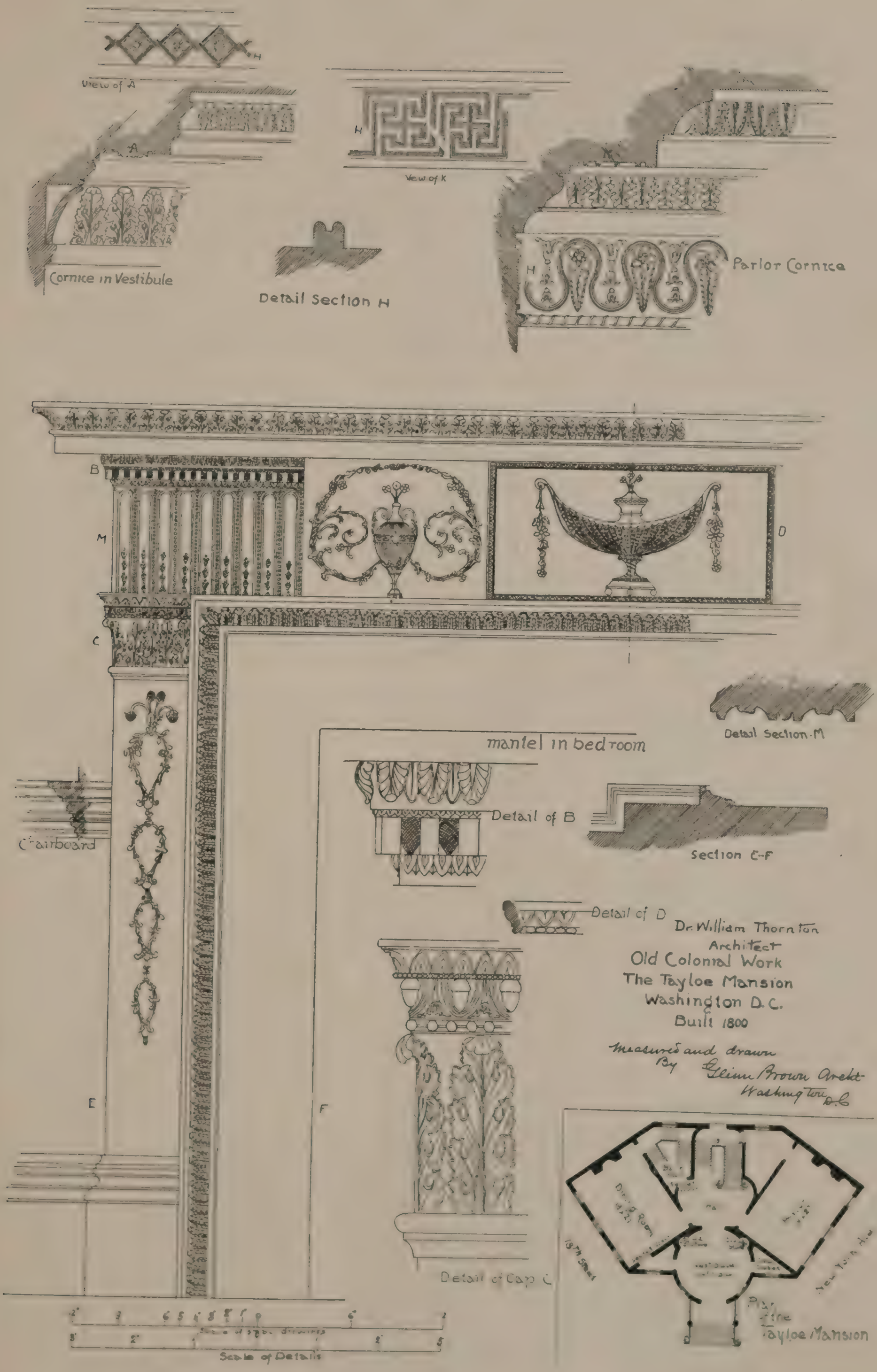
When or where Thornton prosecuted his architectural studies is not recorded. It has been asserted by some writers that he was simply a dilletante in the profession. The only way in which we can judge of his attainments is by an examination of his work, and a knowledge of the estimation in which he was held by his contemporaries. His drawings show skill in draftsmanship, as well as education and refinement in design. His executed work compares favorably with the best of the period, in design and construction. He was trusted in a professional capacity during long periods by such astute men as Washington, Jefferson, Madison and many others.

Adolf Cluss, in an address in 1869, calls him an amateur. J. H. B. Latrobe, in an address delivered before the American Institute of Architects in Washington, in 1881, states that Thornton had only two weeks' study in the profession. Trumbull gives him the credit of having studied three months. To have accomplished so

---

*Proceedings of Commissioners, Vol. 1, p. 407.

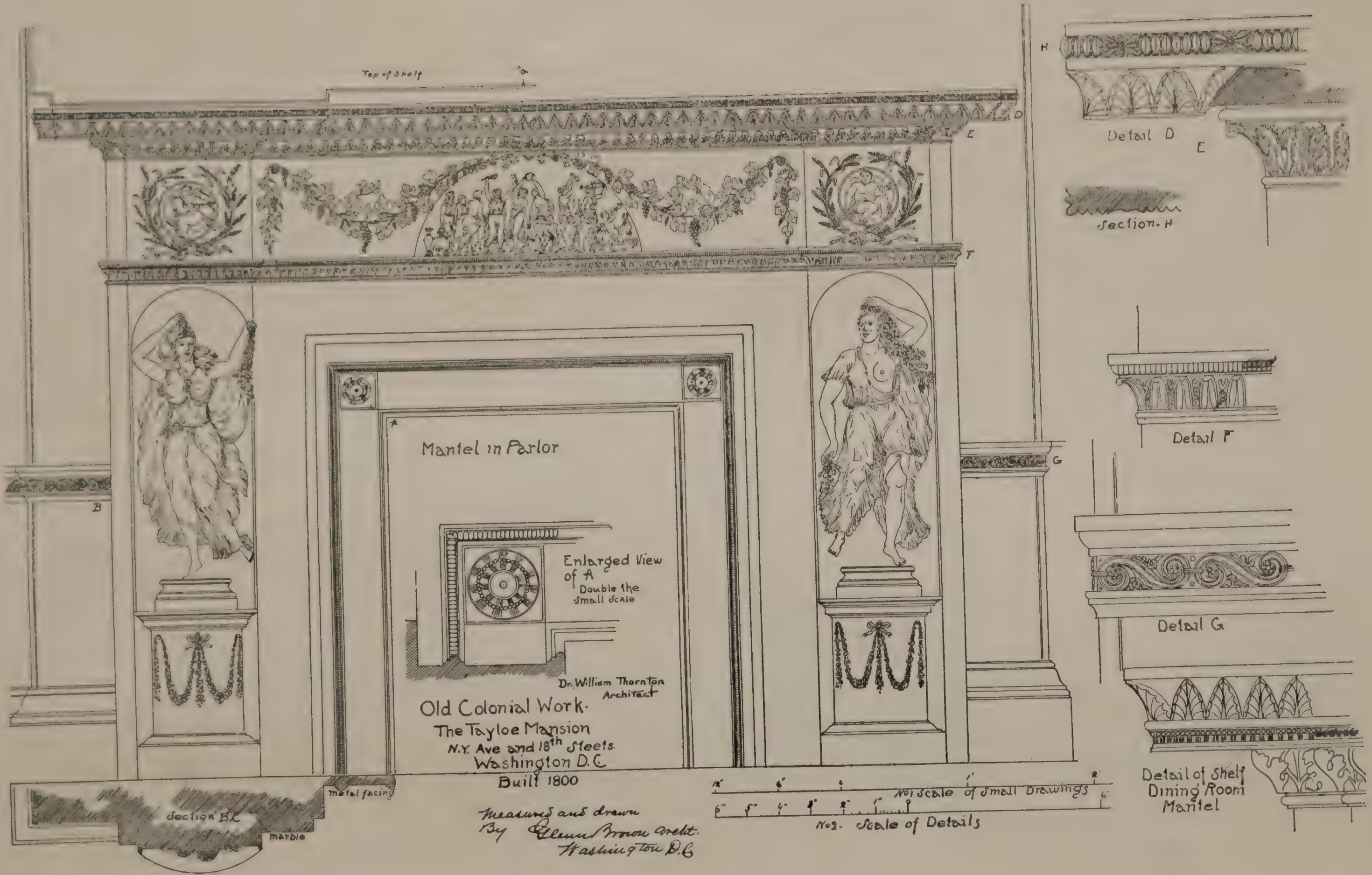
*Science Record, 1872.



Dr. William Thornton
Architect
Old Colonial Work
The Tayloe Mansion
Washington D.C.
Built 1800

Measured and drawn
By Glenn Brown Archt
Washington D.C.

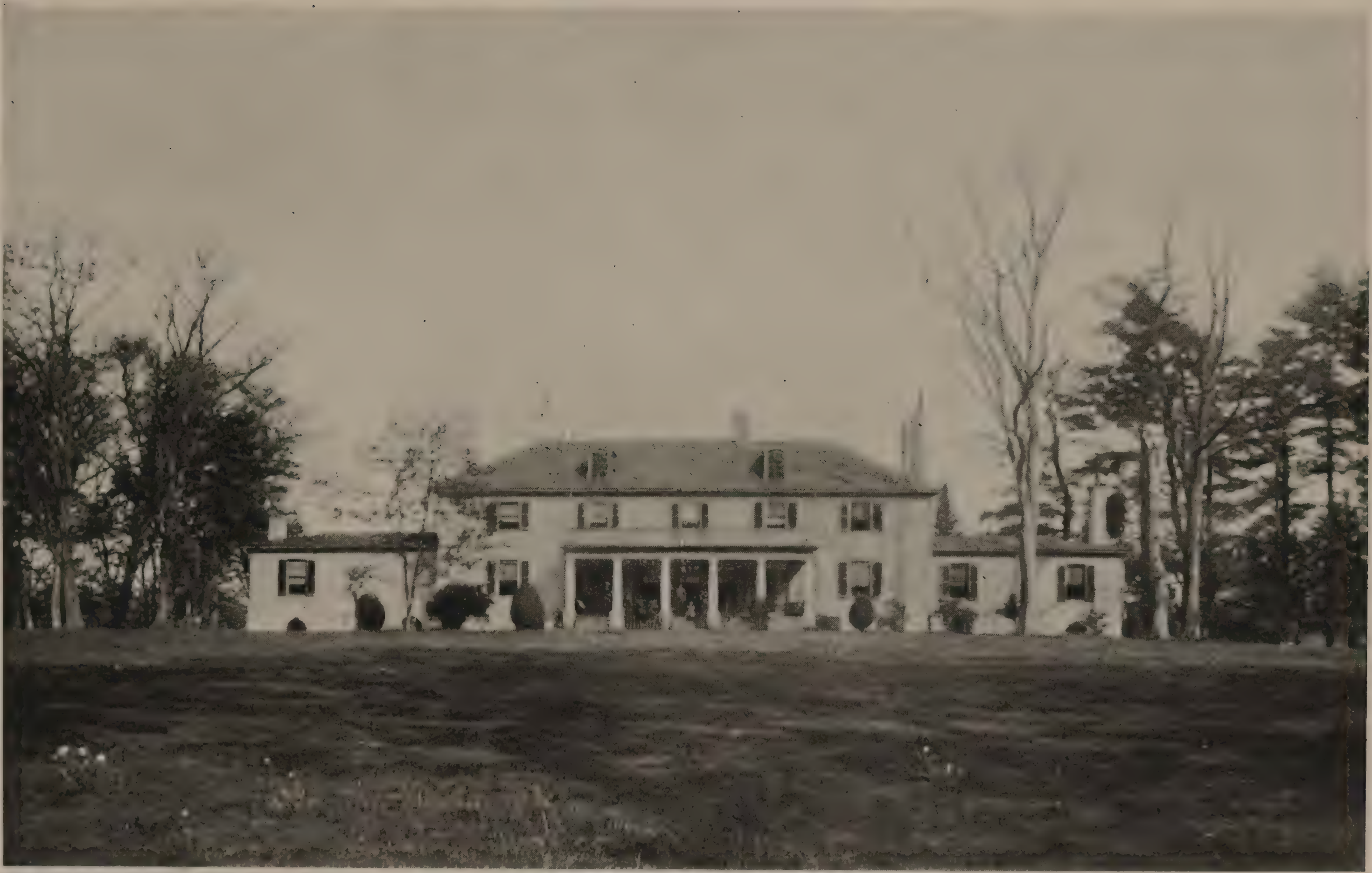
BOSTON PUBLIC LIBRARY.



Old Colonial Work.
The Tayloe Mansion
N.Y. Ave and 18th Steets.
Washington D.C
Built 1800

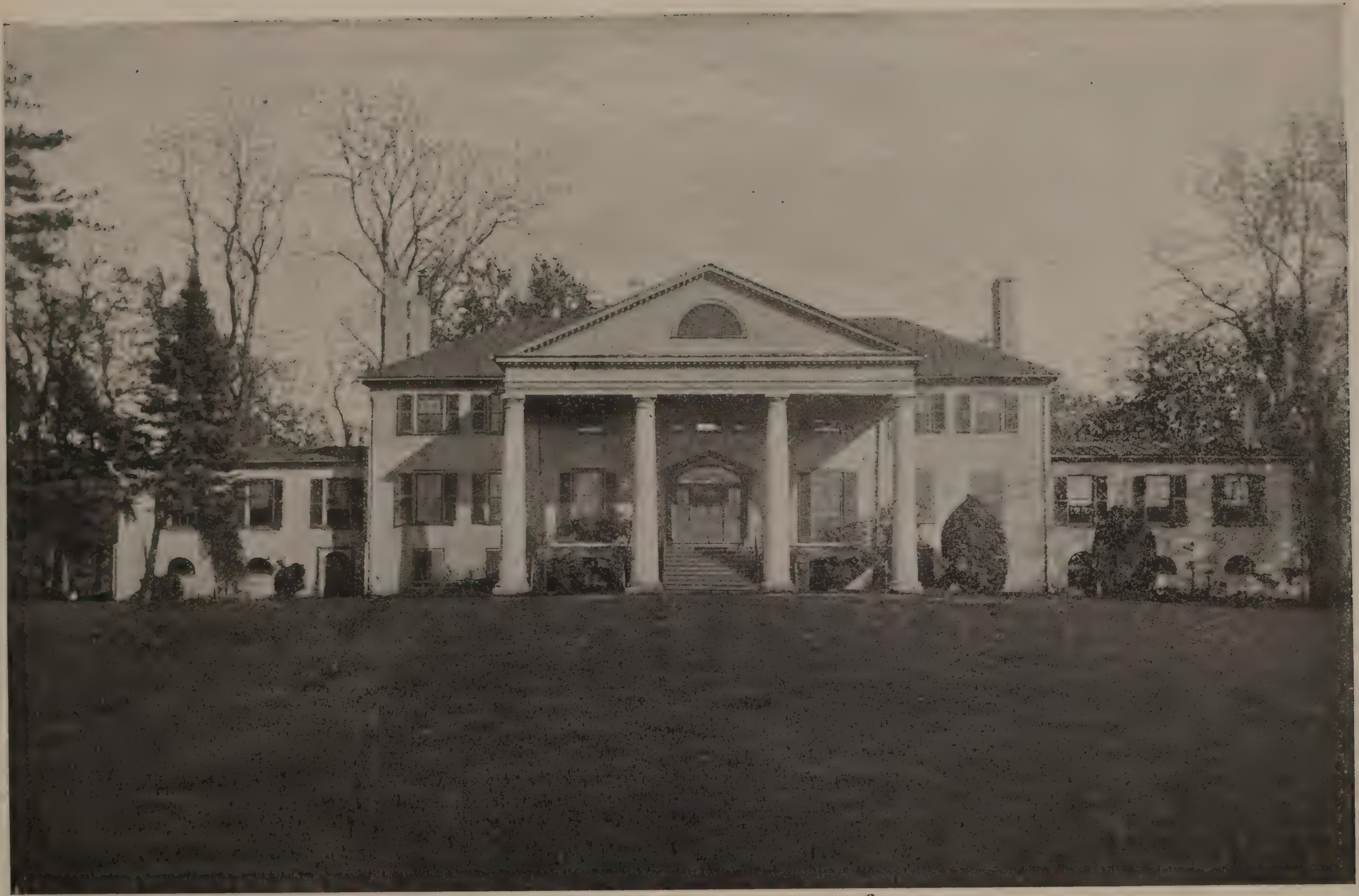
Dr. William Thornton
Architect

Measured and drawn
By Glenn Brown archt.
Washington D.C



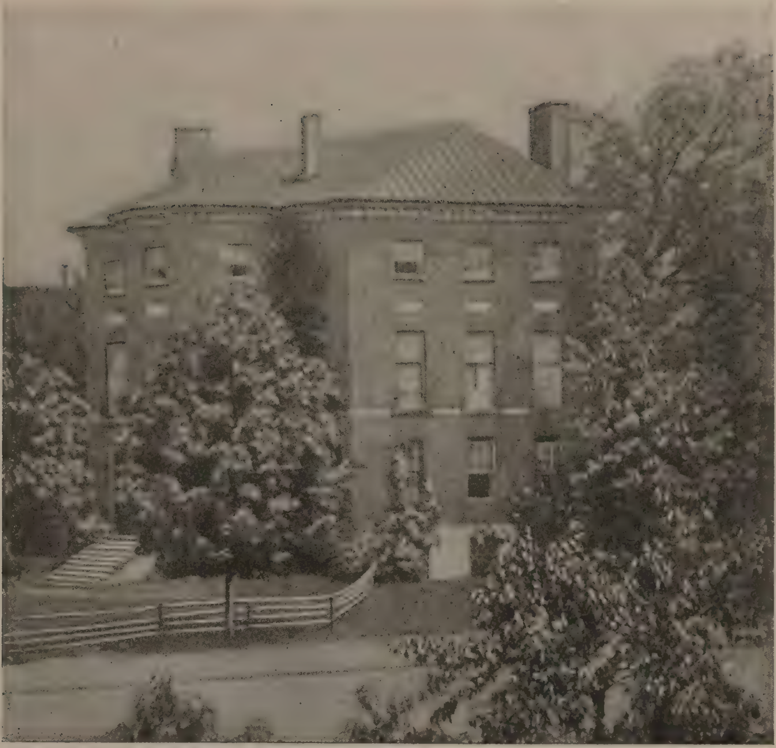
BOSTON PUBLIC LIBRARY

Montpelier, Va. HOME OF PRESIDENT MADISON—REAR VIEW. Wm. Thornton, Architect



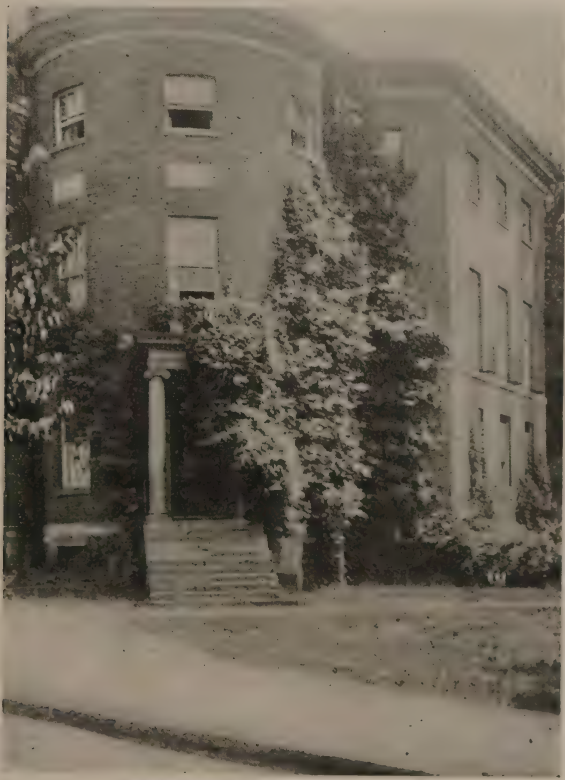
BOSTON

Montpelier, Va. HOME OF MADISON—FRONT VIEW. Wm. Thornton, Architect.



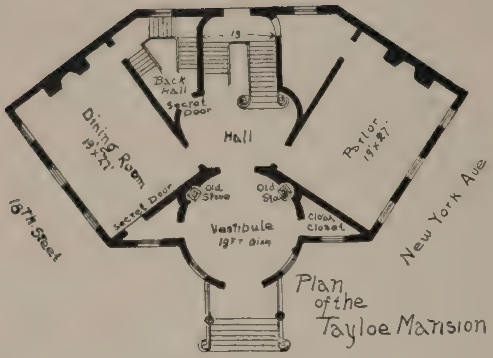
BOSTON PUBLIC LIBRARY.

OCTAGON HOUSE—COMPLETED IN 1800.

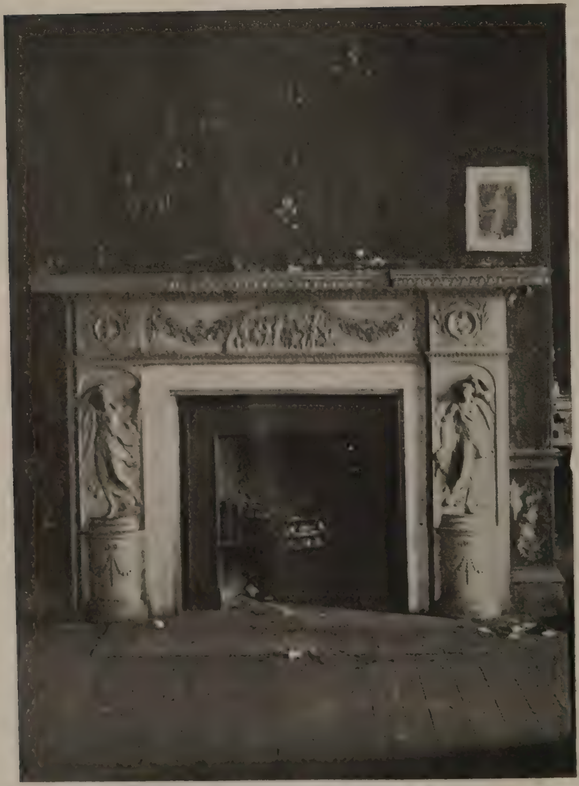


BOSTON PUBLIC LIBRARY.

OCTAGON HOUSE.



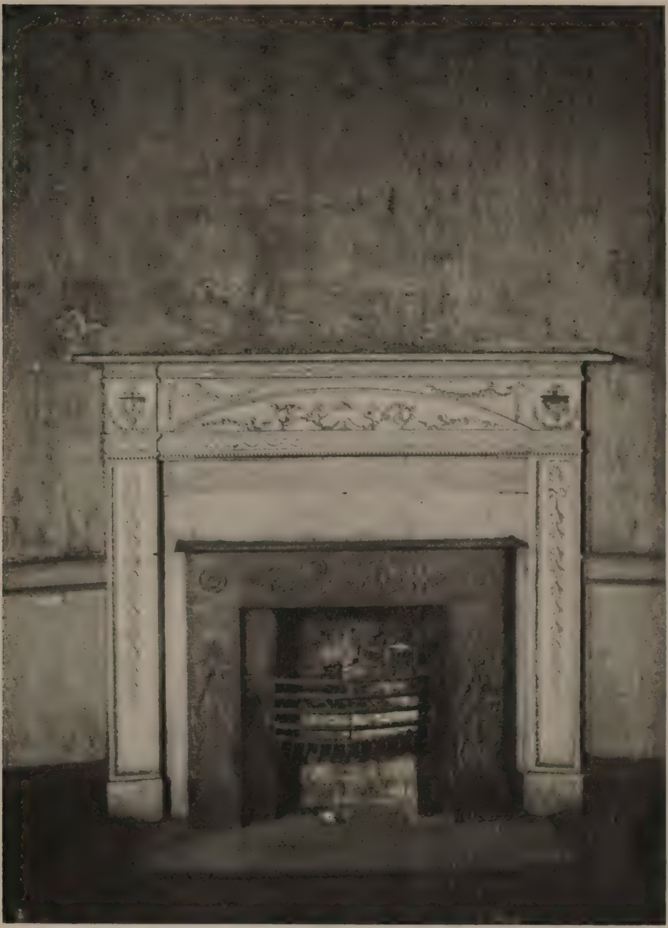
Plan of the Tayloe Mansion



BOSTON PUBLIC LIBRA

OCTAGON HOUSE—PARLOR MANTEL.

Wm. Thornton, Architect.



OCTAGON HOUSE—MANTEL IN MADISON'S HOUSE.
Wm. Thornton, Architect.

much with so little study, he must have been a truly remarkable man.

THORNTON'S PRIVATE ARCHITECTURAL WORK.

Washington erected a building on North Capitol street, between B and C streets, Washington, D. C., which at the present time is known as the Hillman House. Dr. Thornton was the architect and superintendent, as shown by letters of Washington. The exterior of the building has been altered and additional stories have been added. Some of the interior work still remains intact and shows the skill and refinement of the architect in detail. (See Figs. 3 and 4.) An old sketch gives an idea of the exterior of this building as it appeared in 1793.

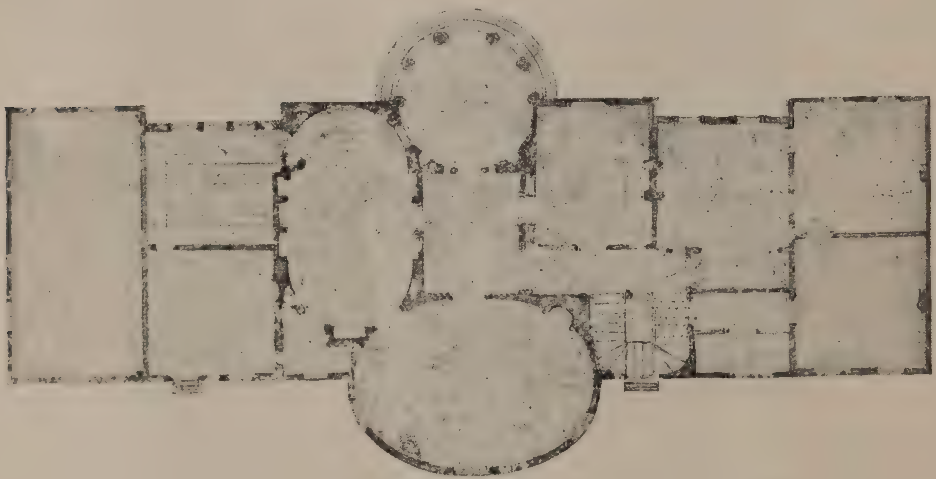
Montpelier, Orange County, Virginia, the country residence of James Madison, was another piece of Thornton's work, which in dignity, simplicity and refinement compares favorably with some of the best modern residences In a letter to Mrs. M. H. Smith, September, 1830, President Madison says: *"The only drawing of my house is that by Dr. Wm. Thornton, it is without the wings now making a part of it." (See Fig. 5, Montpelier home of Madison.) The interior of Montpelier has been remodelled out of all semblance to its original self.

---

*Writings of Madison, Vol 4.

The Octagon house, Washington City, one of the most interesting old residences in this section of the country, was built by John Tayloe and completed in 1801. Geo. Washington took a lively interest in its erection as it was by his advice that the owner of the Octagon selected Washington for his home. Thornton was the architect.† (Fig. 6—Exterior view of Tayloe's Octagon house.)

This house on the exterior is simple and dignified, being built of brick, with sandstone trimmings. The entrance porch had stone columns with Ionic caps. The plan is peculiarly interesting. It can be easily understood from the illustration. (Fig. 7.—Plan of Octagon house.)



Tudor Place—Ground Plan. Wm. Thornton, Architect.

The interior work, such as mantels, cornices, pilasters and doors, were rich, elaborate, refined and thorough in their construction. They are still in an excellent state of preservation, although the house has been indifferently cared for for many years. (See Figs. 8 and 9, mantel in parlor; 10, mantel in bedroom; 11, detailed measured drawings.)

The doors and trimmings in this house are mahogany. The figures on the parlor mantel are so good that they must have been made by some of the noted scultpors of that dav. possibly Canova, or Thorwaldson; John Tayloe being wealthy, could have indulged his taste in such things.

*This house is interesting also from its historical associations. Madison having occupied it after the White House was burned by the British in 1814.

The Tudor House, Georgetown, D. C., was built about 1810, by a Mr. Peter. Although an imposing old structure, the work does not compare with that shown in the Octagon House.

The interest in this house centers in the fact that one of Thornton's original sketches for both plan and elevation are still in existence. (See Figs. 13 and 14.) The exterior of this house is very nearly in its original condition. In the plan will be noticed the elliptical form of room which Thornton first used in his plan of the Capitol. While the exterior of this house is an improvement on the sketch, the alterations in plan, probably to save money, is decidedly inferior to the original.

There are several of Thornton's sketches for private houses in my possession.

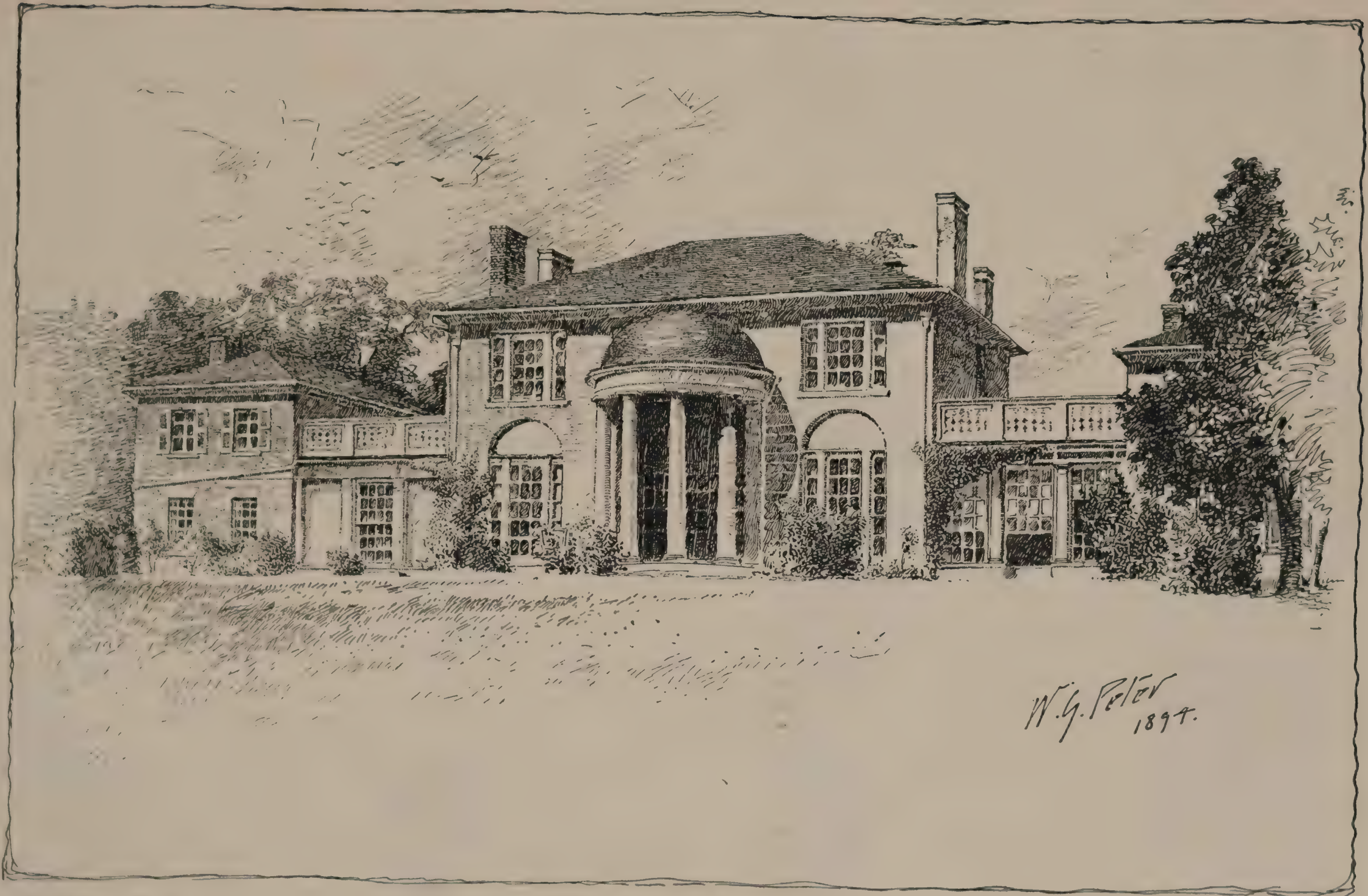
THORNTON'S PUBLIC ARCHITECTURAL WORK.

He made Jefferson a design for the Va-Mace, in which he used the rattlesnake as the principal feature, because

---

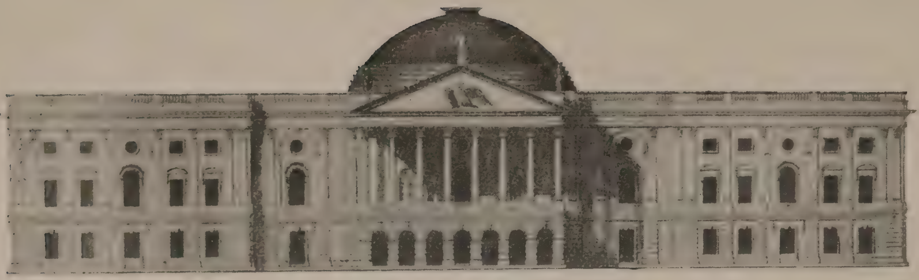
†In Memoriam, Tayloe.

*See Article by Author on Octagon House, American Architect and Building News

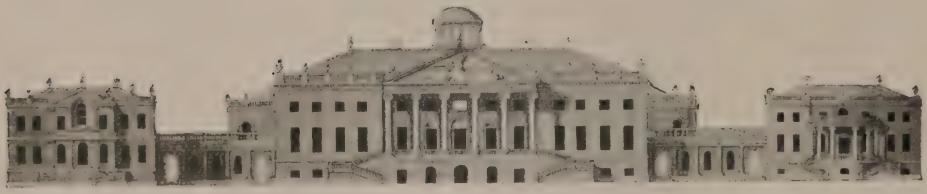


Georgetown, D. C. TUDOR PLACE—AS ERECTED. Wm. Thornton, Architect.

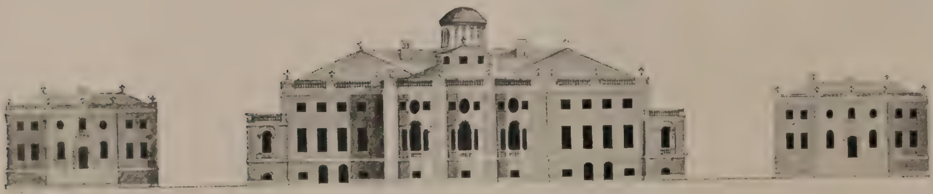
BOSTON PUBLIC LIB



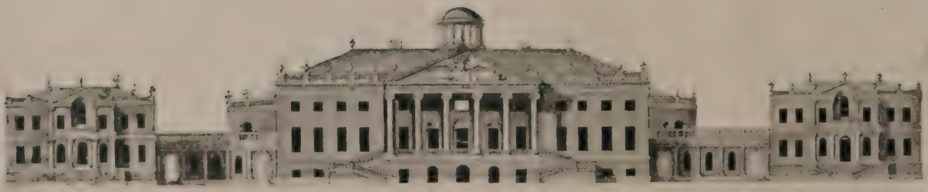
Modified Elevation of the Capitol—North Wing Completed Under Thornton's Supervision.



Thornton's Competitive Design for the President's House—Modified View of Wing.



Competitive Design for the President's House, Made in 1792—Rear View.



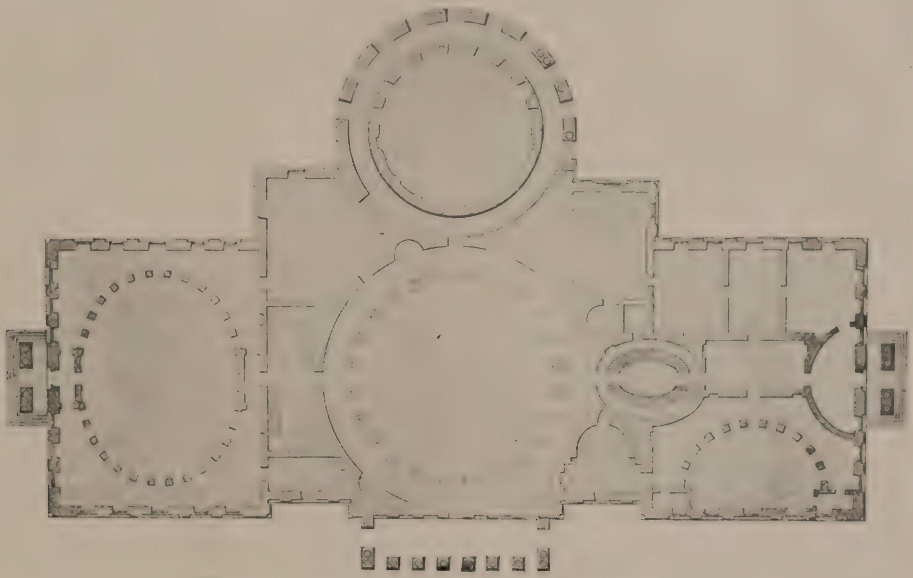
Competitive Design for the President's House, 1792—Front View.

it is peculiarly American, is peaceful until hurt or aroused for self-defence, and only strikes after giving warning.

He made an elaborate scheme for a Washington monument, a description and rough sketch of which are among his private papers. The sketch shows a mound of massive natural boulders, on and around which are grouped many typical and natural figures, Washington surmounting the whole.

THORNTON'S COMPETITIVE DESIGN FOR THE PRESIDENT'S HOUSE.

Among the drawings of Thornton's which Mr. Edward Clark has loaned me, is evidently his design for the President's house. Thornton wrote from Tortola to the commissioners at that date, 1792, stating that he had made designs in conformity with the advertisements soliciting competitive plans for the President's house and Capitol. In an answer to this letter, Nov. 15th, 1792, the commissioners state that the plan for the President's palace had already been selected.



Thornton's Sketch Plan of the Capitol, Washington, D. C.

This design of Thornton's conforms with the requirements of the advertisement which suggests a central building and wings, built of brick and stone. Knowing that Thornton made such a design, it will be readily seen that this could not have been prepared for any other purpose.

This sketch, as can be seen by the illustration (Figs. 18 to 20), shows a well executed wash drawing of good proportion, dignified and simple in its treatment. The alternate flap (Fig. 19), suggests a decidedly improved form for the wings.

It is difficult to understand the plan of the building from the elevations, although it is clear that official, private and social duties were each intended to have an apartment to themselves.

It is difficult to compare this plan with the present structure, of which only the central portion has been erected. The central portion of Thornton's design will compare favorably

THE CAPITOL OF THE UNITED STATES.

Decidedly the most interesting piece of Thornton's architectural work was the successful design for the Capitol. An advertisement solicited competitive plans for the Capitol and President's house, in March, 1792. During July of the same year, plans were submitted. None was found suitable for the former building. In July, Thornton wrote to the commissioners that he had not heard of the competition in time to prepare his drawings, but as the first drawings submitted would most probably not fill the requirements, he requested that his designs might be examined. On December 4th, the commissioners requested Thornton to send his plan of the Capitol to the President. The period between July and December was given by the commissioners and Washington to the consideration of the modifications of the plans submitted, Mr. Hallet, whose plan was most successful, working under the direction of the commissioners. They waited three weeks after the expiration of the time Hallet promised his modifications and requested Thornton to send drawings to the President at the same time. Feb. 7th, 1793, the commissioners state the general satisfaction of the President, themselves and others in the plan of Thornton. Washington says: "Grandeur, simplicity and convenience seem so well combined that I do not doubt it will meet the commissioners' approbation."

April 15th, 1793, Thornton received a formal notice of the acceptance of his plan, for which he received $500 and a building lot in the City of Washington.

Thornton would not agree to devote his whole time to superintending the work, and Stephen Hallet, George Hadfield and James Hoban were employed at different periods as superintendents.

Hallet, almost as soon as he received his appointment, endeavored to engraft upon the work his own ideas. For this reason he was discharged. To prevent further attempts of this kind was probably one of the reasons why President Washington appointed Thornton one of the commissioners (Sept. 12, 1794). The commissioners had full power over the Federal buildings, and as Thornton held this position until 1802, he was able to prevent further tampering with his design for that length of time. Hadfield was appointed to take Hallet's place, special note being made of the fact that he was only to act as superintendent. In spite of this warning one of his first efforts was to induce President Washington to allow him to change certain features which he considered improper. He was curtly notified to attend to the duties for which he had been employed. As he seems to have been unable to accomplish this end, he resigned, but was re-employed on making special agreement to confine himself to superintendence. He retained the position until 1798.

James Hoban was employed as superintendent of the Capitol, in addition to his duties at the President's house, whenever the Capitol was without its separate superintendent. Hoban and Thornton seem to have been excellent friends, as each attended to his proper duties. Hoban's duties at the White House prevented his employment, except in an emergency.

Thornton's actual connection with the Capitol ceased when the office of commissioner was abolished in 1802. Latrobe was appointed by Jefferson to take charge of the Capitol. Just before Latrobe's appointment, Thornton objected to changes which Jefferson wished to make,saying: *"They would not be in accordance with his (Thornton's) plans of the Capitol." Whether this persistence in adhering to his own ideas was the cause of his further services in this connection being dispensed with, there is nothing to show.

Although his advice was not asked in connection with changes, he still took a lively interest in the slur Latrobe cast upon the plan, design and workmanship of this building, and wrote an effective answer to Latrobe's private letter to Congressmen (a printed document) in which the facts stated by Thornton are proved either by the documents on file in the office of Commissioners of Public Buildings and Grounds, or by letters in the hands of private individuals.

Government documents prove the following facts in reference to Thornton's connection with the Capitol. His design was selected in a second competition. This design was modified principally to make it cost less, and use some less daring methods of construction than were suggested in Thornton's

---

*Old letters in the hands of private parties.

original sketches. The modified design made by Thornton was commenced and carried out until the abolition of the board of commissioners, practically without any change. Many attempts were made to modify this plan. Hallet put in a foundation for a square centre in place of the contemplated dome. When Thornton was appointed commissioner, Washington requested him to see that everything was rectified so that the building would conform to the original plan. Thornton at this time drew another elevation and restored the dome on the plans; he made new sections and other drawings some of which he thought improved the appearance.

When Thornton retired from the work the old north wing was completed, this is the portion of the building in which is situated the Supreme Court. The foundation of the rotunda was nearly if not completely laid and the foundation and basement walls of the old south wing were in place (present Hall of Statuary).

Latrobe complains in his private letter that he must necessarily conform the exterior of the (old) south wing with Thornton's (old) north wing. Latrobe made changes in the Hall of Representatives (this is neither the present Hall of Statuary or of Representatives), which were decidedly inferior to form shown in Thornton's plan.

This room was destroyed by fire in 1814.

The central portion was not completed for years afterwards, but from the plans and descriptions extant it must have been largely on the lines laid out by Thornton in his accepted plan, with the exception of the semicircular western porch.

THORNTON AS SUPERINTENDENT OF PATENTS.

When the Board of Commissioners was abolished, Thornton was placed in charge of issuing patents. The first patent legislation occurred in 1790. The Secretaries of war, State and Attorney General were authorized to grant patents.* It is stated that over the issue of the first patents Jefferson, Secretary of State; Knox, Secretary of War; and Randolph, Attorney General would hold special conferences. In 1793, this law was changed, putting the matter in the hands of the Secretary of State. In May, 1802, President Jefferson appointed Wm. Thornton a clerk, at $1,400 per year, to take charge of patents. At one period he was given $2,000 a year as Superintendent of Patents, at the same time acting as Justice of the Peace, being entitled to certain fees, a Commissioner of Bankruptcy and a member of Levy Court. He was the first to have charge of patents. His salary, with other positions, was supposed to be $2,400. Madison urged Congress to give him this amount for his patent office work.

In 1810, Thornton moved models, records, etc., into Blodgett's Hotel. The government had purchased this building, located on the north side of E Street, between 7th and 8th Streets. Into the east end of this building the Patent Office was moved. The U. S. Patent and Postoffice remained in this building until the fire of 1836.

In the Blue Book of 1821 Thornton is recorded as Superintendent of Patents. Mr. Campbell says: "During many years of his superintendency, he freely exercised his discretion in issuing patents.

"In a communication to the Secretary of State, Jan. 16th, 1818, Thornton defined equities and limitations of a reissue as concisely and luminously as has ever been done by any court or text writer."

From Thornton's practice grew the Act of July 3d, 1832, providing for the reissue of a defective patent. Thornton held this office until his death, March 28, 1828.

When the present Patent Office was being erected, Mrs. Thornton requested Robert Mills, the architect, to put either a niche or bracket in the building for the reception of a bust of Thornton, because he had done so much for the good of this department. No notice seems to have been taken of this request.

In 1873, Mrs Adelaide Talbot, a half niece of Thornton, presented to the Patent Office the portrait of Thornton.

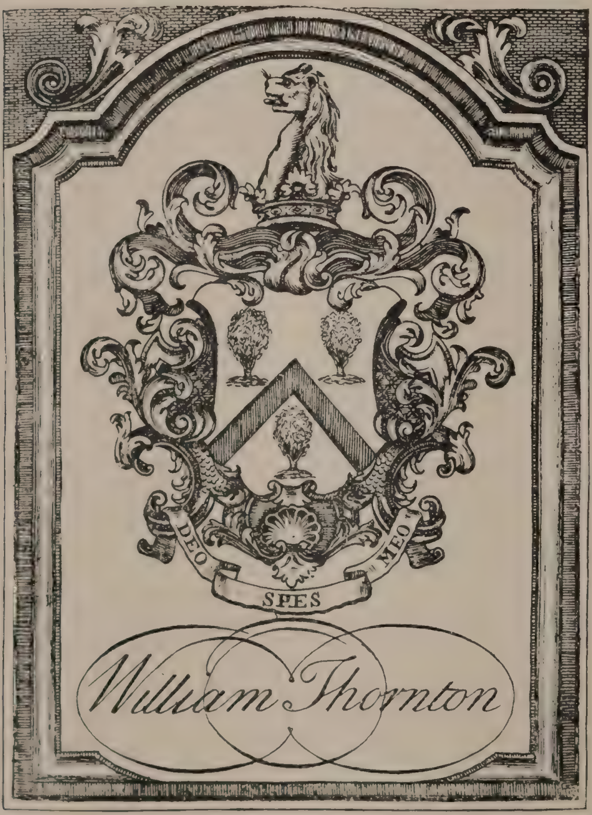
---

*Patent System of the United States. L. H. Campbell.

It hangs in a place of honor in the Commissioner's room.

Thornton is buried in the Congressional Cemetery, under a tomb similar in form to those erected to Senators and Representatives. The President of the United States, members of the cabinet, and of Congress, followed his body to the grave. On his tomb is chiseled his motto,"Deo Spes Meo."

Glenn Brown



AUTHORITY IN ARCHITECTURAL DESIGN.

WITH the revived interest in architecture, and with the knowledge of it that has come within these latter years to the inhabitants of the United States, there have come innumerable notions, more or less wise, more or less persistently expressed, each one demanding some restriction upon the doings of architects in order to suit the views of its especial advocates.

The restrictions are either statutes enacted or demanded, or deference to certain ideas expressed with the boldness of authority, and tending always toward the use of legal force to maintain them.

Outside of building laws, which are, ninety-nine hundredths of them, politicians' tools for party aggrandizement, special enactments are continually demanded. Chief among these is the law to limit the height of buildings and the law to regulate their height by that of adjoining buildings, so as to secure as far as possible a uniform height of all the buildings in a street. Not less important is the bill to give politicians the power to prevent architects from practising at all, based, I presume, upon the well-known ignorance, incompetence and dishonesty of architects, and the intelligence and incontaminability of politicians. Add to these the various art commissions upon statuary, paintings and so on, that it is proposed to establish, that in some cases have been established, perhaps without legal power, yet claiming to be the voice of alleged authority, and ready at the earliest opportunity to enforce their views by law.

Two causes, one general and one special, yet closely connected, are discernible. One is the general reactionary tendency observable in this country to forsake the ideas of the founders of the Republic, that government should be reduced to a minimum; that it was the privilege of the members of a free government to do what constituted for each of them the pursuit of happiness, whether others regarded it as moral or immoral; that only to repress attacks upon this freedom should governmental organizations be used. Forsaking all this, the tendency of the moment is to make the acts of each, however clearly non-aggressive, subject to the censorship of the mobile vulgus.

The special cause is the growing number of those who obtain their education in Europe; who, carried away by the grace and charm of the older civilization, admirably and laudably wish their friends to share their pleasure; and to that end would erect in a moment here what a thousand years has there slowly ripened; would build for us a dreamland with what sticks and canvas and paint may be obtainable; would construct for us thankless ones, a diadem with Dutch foil and quartz sparks, a sunset with lanterns and colored glass.

For up to the very last point we

may hold with this Europeanizing school, agree with them, admire them, love them. They are true and sincere lovers of the worthy, the beautiful, the refined.

They say, and they say truly, that American architecture is for the most part barbarous. They show, and it is undeniable, that our public works of art, statues and parks, are mostly monstrous.

Let us acquaint you, they say, with better things, such as you yourselves, when you come to know them, will admit to be better than what you have hitherto done.

However much we may be disposed to deny, fair and candid dealing will compel us to admit all that these men charge. We are as a nation, half-baked and barbarous. Moreover,we are commercialized, in this commercial age, beyond any other country. Others have traditions, feudal and ancestral, or ethical and religious, that mitigate the asperity of a purely commercial regime, traditions of noblesse oblige, for both prince and peasant, of affection for ancient landmarks, monuments and customs, that do much to maintain the harmony of a past time through the present chaos of transition. But here there is no consideration for the mass of us but dollars and cents.

If a building is handsome, that is to say if it is costly and elaborate, we care not for logic or beauty, we do not even know, most of us, what beauty means. It is indeed astounding to discover how far among us the aesthetic sense is atrophied. It is as though in cookery we had lost the sense of taste; as perhaps we might indeed be thought to have lost that also, were it not for the distinct appreciation that we show of French cookery.

So our lack of a sense of beauty has evolved for us an atmosphere which reacts to still further dull us to beauty. How, from an entourage of tenement houses and elevated railroad skeletons, shall an artist emerge?

Although other nations may excel in particular points, yet for aesthetic sense, the French are first. In architecture especially the French once did, what no other nation but the unequalled Greek has done, pushed an architectural style—a style in the highest and best sense, the reasonable adornment of a logical system of construction—to the extremity of perfection.

But, admitting all this, what shall we do to advance ourselves to the plane of the more developed nations?

Will it suffice for us to set up for ourselves as the ultimate authority, methods and ideals that they have evolved? Is it possible for us to graft upon the thousand branchlets of our growth a new species of fruit? And, if it be possible, are we sure that cultivation and selection of the seed of our proper stock may not perhaps excel in quality the scions offered?

The supremacy that I have spoken of as achieved by France in architectural development, the perfecting of the Gothic style, the only style besides the Greek that ever reached perfection, was achieved not by the methods of the schools, but by cutting loose from the methods of the ecclesiastical schools that then ruled, and rejoicing in the spring breeze of a newly found liberty. It was not by churchmen, but by laymen, by the people of the free cities, that the culminating glories of French architecture, during the latter part of the thirteenth and the earlier part of the fourteenth centuries were built. Since then, although the new discovery of antiquity and the decline of religious ecstacy made the Renaissance inevitable, nothing but the genius of the French people has prevented it from degenerating into a mere ossification.

For, in judging of French ideals, even of modern French ideals, too much dependence must not be placed upon their champions here. The reduplication of classical colonnades, the frontispieces of pilasters and cornices, tier upon tier, in unexceptionable Ionic or Corinthian orders, perfect enough in their way, but a little wearisome after we have seen them several thousand times, these are not by any means the ideals of the most conservative French school. On the contrary, they know as well as anybody what logic and good sense mean in design, but an unfortunate spirit of chauvinism leads them to copy themselves, over and over again in the details of ornament, resulting in a degradation which nothing but their innate French good taste saves from failure.

It is to be regretted that I am unable to obtain illustrations to show what I mean. Let me try to describe one typical instance.

Serving as a support to the spring of a certain arch in the Palais de Justice, in Paris, is a hybrid Ionic capital, of a pattern often seen, the volutes springing perpendicularly from the necking and joining each other by a horizontal band just above the necking. Above this is a detached piece of a hybrid architrave. The whole stands upon a corbel of hollow quarter circle profile, bearing in the hollow a sculptured female head. Although the profiles are refined and the carving and modelling excellent, such a curious compound cannot be regarded otherwise than as debased art.

Many similar instances might be brought to warn us not to sit too humbly at the feet of any master. Moreover, no amount of authority can justify such decorations as the familiar festoon, the mask and the escutcheon as intellectually tolerable.

Somewhat revived in our self-esteem by the discovery that we too have some little taste, some little intelligence. Let us ask ourselves whether we have not abased ourselves too much, whether there may not be virtues hidden under our uninviting exterior, seeds of flowers yet to bloom.

We are encouraged in this view by the expressed opinions of French writers themselves. Says a contemporary French periodical, speaking of Americans and American art: "One might be willingly tempted to think that a race so absorbed by business and commerce would be entirely deprived of artistic sense. It is not so; the Americans are better endowed, in this respect, than the pure Anglo-Saxon race. Their painters appear with honor at our exhibitions, and one may listen to a girl from New York or Washington sing without stopping his ears. As for their architecture, in the midst of imitations of all styles, one encounters, often an attempt that is happy—original. . . . . .

"But what is peculiar to them is the construction of their lofty buildings, of which we have on several occasions given characteristic specimens. In this order of ideas they have known how to answer to new needs with novel inventions, which by their originality often present both good proportions and a certain majesty in their mass."

"Nos confrères des Etats-Unis ont une science de confort que nous ignorons absolument."

Moniteur des Architectes Nos. 11-12, p. 119, 1893.

Nor is this a single note of approval; on the contrary, the habitual attitude of the French press joins to its expressions of disapproval of the horrors that we do perpetrate, an outspoken wonder at, and admiration of, great gifts beneath.

Thus, in speaking of American interiors, another writer remarks: "Our fellow architects in the United States have a knowledge of comfort of which we are absolutely ignorant."

On serait volontiers tenté de croire qu' une race aussi absorbée par les affaires et le commerce est entièrement dépourvue du sens artistique.

Il n'en est rien; les Americains sont mieux doués sous ce rapport, que la race anglo-saxonne pure Leurs peintres figurent avec honneur à nos expositions, et l'on peut entendre chanter une miss de New York ou de Washington sans se boucher les oreilles. Quant a' l' architecture, au milieu d'imitations de tous les styles, on rencontre souvent une tentative heureuse, originale. * *

Mais ce qui leur est propre, c'est la construction de leurs hautes maisons, dont nous avons donné, a plusieurs reprises des specimens caractéristiques. Dans cet ordre d'idées, à des besoins nouveaux ils ont su répondre par des créations nouvelles, qui, par leur originalité et présentent souvent des proportions heureuses et une certaine majesté dans leur masse.

- La Construction Moderne, 1 July 1893.

More noteworthy yet is the attitude of the French critics of the World's Fair, at Chicago. In that, all of the large buildings, except one, were avowedly designed upon the system supposed to be inculcated by the Ecole des Beaux Arts; and embodied some of the principles which the law is now to be invoked to force upon us, such as the uniformity of the line of cornice.

One great building stood apart, the Transportation Building, done by the gifted Sullivan, a man of original thought in other directions as well as in architecture.

In general effect it might be said to approach Romanesque, the especial antipathy of the advocates of French methods, so far as the presence of round arches and a total avoidance of Renaissance detail counts; but the detail was something by itself, elaborated by the peculiar invention of the designer, and as individual as Richardson's was in its way. Moreover, in color also this building stood apart.

Eschewing the general whiteness, which is held to be most suited to the conventional Renaissance type, it boldly strove for a brilliant external color treatment, all the outside detail being enforced by the richest painting. Yet the French critics picked out this heterodox building for commendation, and sneered at the rest of the buildings, unconscious of the flattery of French orthodox design that a sincere attempt at imitation might be justly held to imply.

Estimating ourselves then, not by our own opinion of ourselves, which is more than modest, but by the opinion of those whom we have recognized as worthy of our greatest esteem and of all the encomiums of their champions, we find, when we consult the authorities themselves, and not the champions, that the authorities admire in us the very things that their champions condemn. Our high buildings which Continentalizers want to suppress by law, are picked out by actual, live Parisian critics as one of our few virtues. Our interiors, although not distinguished by those marks of a clear intellect in design, pilasters and pediments transplanted from exteriors, are yet again praised for the embodied spirit, the highest praise for any design.

All through it is for our breaking away from precedent, our direct shooting at new targets, that we are applauded, and we begin to think that our crudity may be but the crudity of boyishness, as becomes our youth, that recklessness and vigor and frankness and courage and everything most removed from grandmotherliness may be a better foundation for the coming manhood than the powders and perukes, the cocked hats and dancing master's graces of Versailles.

"How often," says Arsène Houssaye, the noted antagonist of scholasticism, "How often, in a civilized age there has been but a clever handling to take the place of the architectural grandeur of a barbarous age. * * * We walk upon heaps of bones, we lean upon piles of rubbish, we build only with broken fragments."

"* * * Que de fois, dans un siècle civilisé, on n' a qu' un manœuvre savant pour remplacer l' architecte grandiose d' un siècle barbare! * * * Nous marchons sur des ossements, nous nous appuyons sur des dècombres, nous ne batissons q' avec des débris! * * * " Arsène Houssage, Quarante-unième Fauteuil."

There are at the bottom of all social development two principles of action, imitation and initiative; both of them means for gratifying desire, the one by the sure and tried course of what has been done before; the other, risking failure on the chance of greater success. Although alarmists are forever warning us against novelties, pointing out the risk, minimizing the possible gain, yet experience shows that it is actually safer to be too progressive than too conservative. Nations have perished over and over again from conservatism, never yet one from progressiveness.

Still the two principles of action survive, the one conservative, holding up always the past as the model, perplexed with fear of change, striving for the most part to use the dead force of the majority to resist change; on the other the advanced guard, seeking, like the Greek, to hear or tell some new thing, the progressive misunderstood, rejected by academies and institutes, sometimes crushed, but, if he survive, always leading the way to a future better than the past.

What chance is there that an academy will receive an Ibsen, that a conservatory will recognize a Wagner or an institute a Corot?

Against such organizations the new idea must always struggle. And one reason why the French are less oppressed by their institutions, is their profound confidence in themselves, which leads them finally to accept and glory in the new idea which has been able to assert itself. The French ideal is not the past, it is the present, their own present, hence they suffer less than would a nation constitutionally less progressive.

Excellent as may be the ideals held up by any school, lofty as may be their standard, we shall always do well to reserve our own deepest admiration for the man that advances that ideal or raises that standard by little or much, rather than for him who contents himself with mere conformity.

So the organizations that have achieved the greatest celebrity are those that have continually accepted and assimilated men of new ideas, although always resisting them to the last. Thus the French Academy refused for a long time to admit de Musset and Hugo; yet at last admitted them, as it now tries to keep Zola out, but will doubtless soon do itself the honor of accepting him. Yet the ranks of French literature are filled with great names which the academy has rejected, from Pascal to Theophile Gautier. The influence of such an academy in conserving the past is trifling, compared with that of an organization which undertakes to instruct as well as to recognize merit.

American architecture is doubtless open to severest criticism, but its faults are not those which legislation or authority can correct.

In the first place, all over the modern world architecture is necessarily heterogenous a mixture of many and often discordant styles. How can it be otherwise and yet be truthful? In the past the architect of Cologne traveled as far as Amiens, saw there the greatest and best that men had devised, and could but copy, with what improvements he might hope to add. Nowadays, in photographs, if not in actual travel, we roam over the known world; we are as familiar with the pagodas of India, the temples of Japan, as with the theatres and palaces and churches of Spain and Russia and Mexico. All history, past and current, is at hand.

Persia and Assyria we have dug up and now wander through their ruins. Greece and Rome are as familiar to us as Boston and Philadelphia: The Forum and the Via Sacra as the Avenue des Champs Elysees and the Court of the Louvre.

What can we do but reflect our minds in our deeds? How can we build without betraying our world knowledge? If the historical styles have each represented the events and ideas of its time, how can the architecture of this strange, heterogenous, chaotic, anomalous nineteenth century, culmination of a great past, vestibule of a new and more glorious future, be other than strange, chaotic and anomalous? How, in the absence of the unifying idea that is to come, can it be other than a more or less skilful statement of the fact that men know now the whole world.

Only twice in the brief history of the world so far, has a great idea given a soul to stones; once when the Greek worshipped the beauty of the present, once when Christendom worshipped the beauty of a fancied future.

The third time it will come no doubt, but its coming will not be accelerated by school methods nor by academic restraints, these will only delay it.

Along with the inevitable variety is an equally inevitable crudity. Just at present we care very little for beauty, we are striving for material advance. We content ourselves with the roughest imitation of the adornments that past ages devised. Just so, as Graeco-Roman ideals and arts declined, did the world labor through a long period of material struggle, while its art was but a rough reminiscence of the past.

Political and social problems now press upon us, and the exigency forbids the calmer artistic study of a more stable period.

Yet, in the midst of the clamor where is it that we see most promise of the future?

Is it in such "manoeuvres savants" as the typical modern French "hotel particulier," or in the freer, if less symmetrical, homes that such men as Ernest George plant amid the London monotony of ugliness? Is it in the modern French villa or the country house that the best American architects delight in? Is it in such a design as the recently exhibited permiated French Ecole project, correct and studied, but cold and definitely ugly, or in the approximately similar design of French bred American architects for a country house at Greenwich, which was exhibited at the same time,which showed equal study, equal polish, and in addition instead of ugliness, beauty, instead of coldness, charm.

Two kinds of restraints upon architectural practice a temporary wave of reaction is bringing with it: The one, that which expresses itself by attempting to impose its standards upon others by law, that is by force; the other, which contents itself with advocating its standards by voice, pen and example.

Against the first, for men who know what the free life means, there can be nothing but war. Unfortunately for themselves there are too many Americans who have not learned the supreme dictum of freedom, to go their own way and let others go theirs, who are still held by the spirit of domination which enjoys compelling others do its own fancies.

Against the second, no one can have any fair quarrel, except in so far as it tends always to assimilate its methods to the compulsory methods of the former.

An Institute of Architecture in New York, drawing its membership, not from a licensed and ticketed assortment of its own graduates, but from the brilliant spirits that it might gather from within or from without, such an Institute broadly conducted, might add refinement to progress and could do little damage to originality.

Such an Institute might well become, and might well deserve to become, a model for all future schools, establishing its classes, its prizes, its medals, as worthy goals for the pupils of the architectural schools throughout the country.

For such an Institute, abjuring the ways of politicians, preaching eclecticism rather than chauvinism in design, catholicity rather than provincialism in sentiment, there could be none surely but admirers and well-wishers everywhere.

John Beverley Robinson.

ARCHITECTURAL ABERRATIONS.

THE SALVATION ARMY BUILDING.

TO construct a building for the uses of the Salvation Army is undoubtedly to incur a strong temptation to perpetrate an architectural aberration. Consider what is the "basic principle" of the organization in question, so far as that principle can be expressed in building. Is it not that, in order to regenerate a man's spiritual nature, you need not improve him in any other respect? He needs no more mental culture, no more social culture than is already in the possession of the humblest. He does not even need a change of linen or an application of soap and water. More specifically, the method of the society is to vulgarize religion in order to convert the vulgar. The same vulgarity and foolishness that appear in the "knee drill" and the big drum should appear in the façade of a building devoted to the uses of the Army.

Really, suppose that by inadvertence the Army had applied to an accomplished architect to design a building for it, would he not have been justified in concluding that duty to his clients, and fidelity to his problem forbade him to design anything refined and quiet and harmonious, and required him to design something coarse and noisy and discordant. As a conscientious artist should he not cause the thing to reek of vulgarity?

Now, nobody will dispute that the actual building—what the Salvationists in their military-religious jargon would doubtless call the "headquarters"—of the Army fulfils these requisites. Nothing could well be cruder or nosier or more discordant. It would be hard for anything to exceed it in vulgarity. And yet it may be that the qualities which the edifice shows are not at all to be imputed to the architect. We have not the pleasure of knowing him by any other of his works, but it may be that he is perfectly aware of the value of refinement, of the value of harmony, of the value of repose, and that he might show these qualities in a structure which in his professional judgment offered proper scope for them. He may have been doing himself a continual violence in composing this front, just as he does a momentary violence to the sensibilities of every cultivated passer who is forced to look at it. In that case, his work is successful nearly to the point of triumph, as in any other case it is a dismal failure. But in any case whatever it is clearly an aberration.

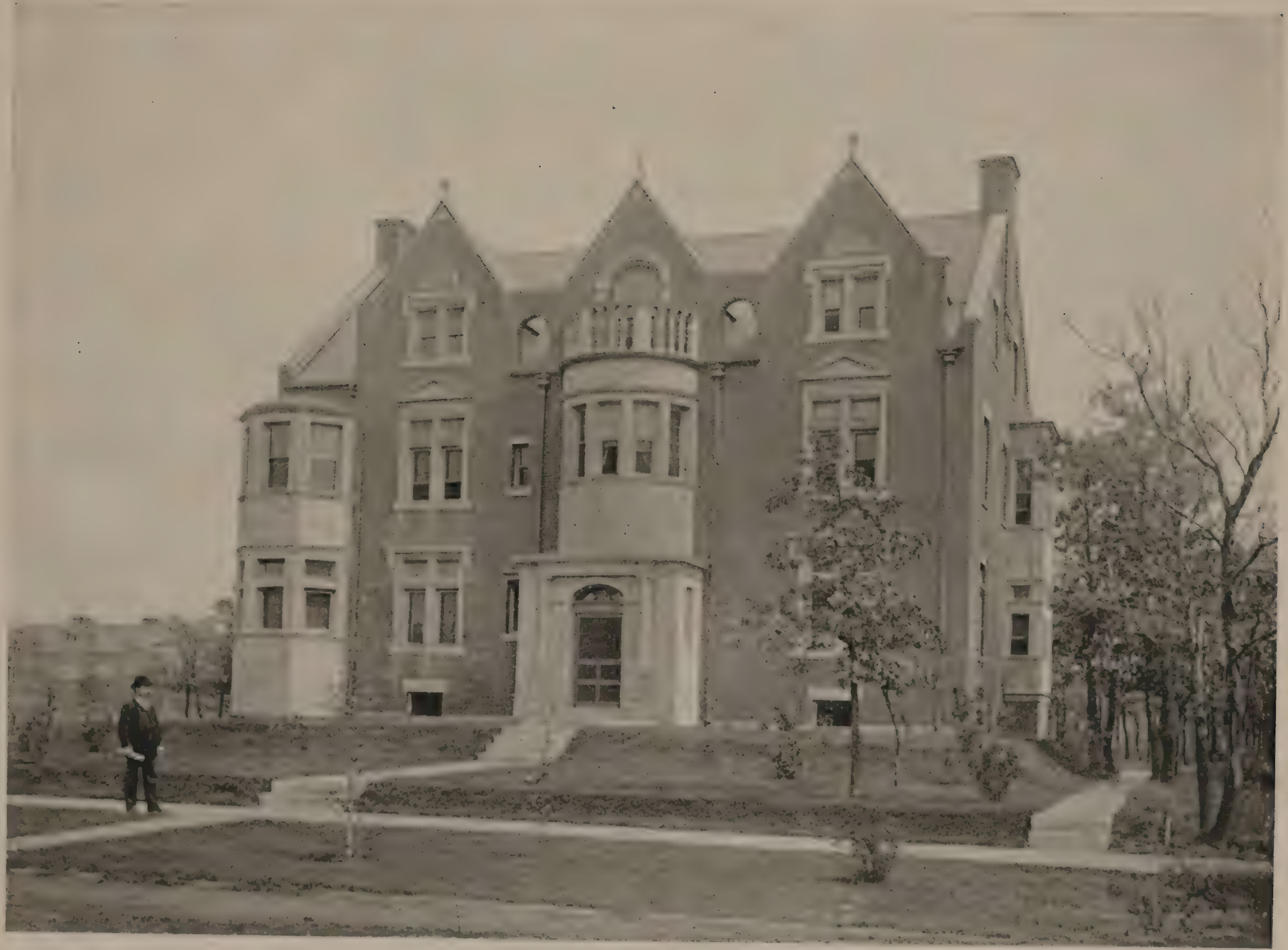
We are not doing psychology, it is true, but architectural criticism, but nevertheless the question keeps recurring, in considering the front, whether the architect "wrought in a sad sincerity" this painful front, or whether he was a satirist in masonry, and did it on purpose. One reason for taking the former and less flattering view is that it would have been practicable for the architect to make the satire so much more broader, and the work so much more outrageous, without exciting the suspicions, nay, even while increasing the enthusiasm of his clients. But on the other hand is the consideration that perhaps he could

THE SALVATION ARMY BUILDING.
Fourteenth St., west of Sixth Avenue, New York City.

not afford it. The easiest and more effectual way of vulgarizing a building, as we may see every day, is by adding things to it. These things, even when they are obvious imitations of more expensive things, thereby enhancing their vulgarity, do yet cost money. But still he has overlooked some very inexpensive ways of making the front more loathsome. The contrast of color, for example, might have added much to its outrageousness without increase of expense. His basement is a mild gray and his superstructure a tepid buff—a timid combination that has been employed in many inoffensive buildings, and that is in itself entirely inoffensive. For the same money he might have made a red basement and a good strong gamboge in his brickwork, interspersing it with other violent crudities of color. In the matter of form, too, he has behaved with moderation. The middle part of his building, for example, is the mere series of tiers of cells in which the steel-frame construction naturally issues. Left alone, such a series, though it would not be impressive, or attractive, or artistic, would have been quiet and inoffensive, and he has very nearly left it alone. True, he has broken in upon the repose it would have had by projecting the centre of it, between the main entrance at the bottom and the tile-roofed tower at the top. This projection undoubtedly has the result of distorting the effect of quiet produced by the expanse of wall. This result is enhanced by the grouping by twos of the openings on the flanking walls instead of leaving them equally spaced, and also by the long corbels introduced at the top of the central projection to carry a balcony which is apparently not a balcony. But upon the whole, in this middle of five stories, which seems to be intended for rental, the architect has not lived up to his privileges, but has produced a piece of wall, which, far from being the outrage upon decency, we had a right to expect, is only a rather huddled, rather vulgar and still very dull piece of work.

But at the top and bottom we admit that he is entitled to turn upon us and declare that whoever demands anything worse than these is unreasonable and impossible to satisfy. The large arches at the sides turned between abutments that are manifestly inadequate to contain them are examples of feebleness pretending to be strength, which are unhappily too common to excite the resentment they deserve. But there is a peculiar and individual infelicity in the treatment of the central entrance, with the projected face and battering sides of its enclosing wall, the superfluous and preposterous corbels of the transom become a balcony, and especially the absurd little suggestion of mediaeval military architecture in its crowning member, become another ostensible balcony. The silliness and vulgarity of this are much enhanced by its execution in sheet metal. This feature, in conjunction with the row of quatrefoils of ecclesiastical Gothic in the balcony below, is an architectural version of what we have already called the military-religious jargon of the architect's clients. The military pretension is still more completely developed at the top, where nothing could exceed the absurdity of the crowning parapet, or its inappropriateness to the commonplace shop-front it crowns, with its barbicans and its crenellations and its loop-holes, from which the beseiged Salvationists must be imagined to pour physical melted lead upon their spiritual besiegers. At the centre the military pretense is lost sight of, unless the lonely apartment in the tower be conceived as the sentry box of the watcher on the walls of Zion.

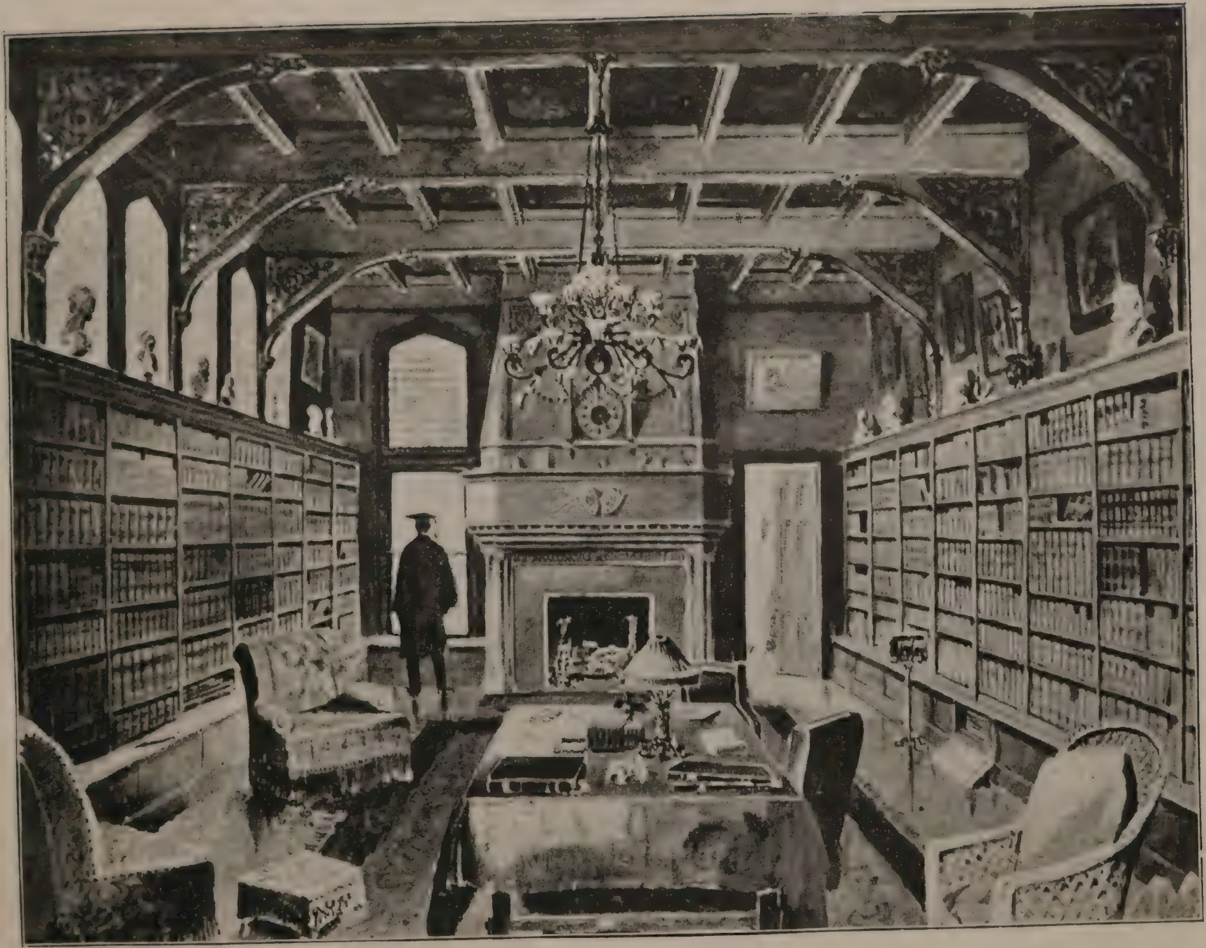
Perhaps, after all, the architect was right, considering him as a satirist, in confining the nonsense to the beginning and the end of his composition, and allowing the central part to appear as a commonplace, baldly utilitarian shop-front. Thereby he has made it possible for persons not connected with the Salvation Army to take quarters in the less shameful parts of the building without exposing themselves and their business to ridicule, while at the two extremities he has held up his clients in their true light. Also he has produced a front which in its general aspect is quite sufficiently vulgar and absurd. To see how vulgar and absurd, compare it with what is visible of its neighbor to the right, which is a specimen of the domestic architecture in New York City of forty years ago, vulgarized only by the signs, and shudder at the transformation that has come over Fourteenth street between 1856 and 1896.



Chicago, Ill.

HOUSE OF PROFESSOR J. L. LAUGHLIN.
Facing University Grounds.

Henry Ives Cobb, Architect.

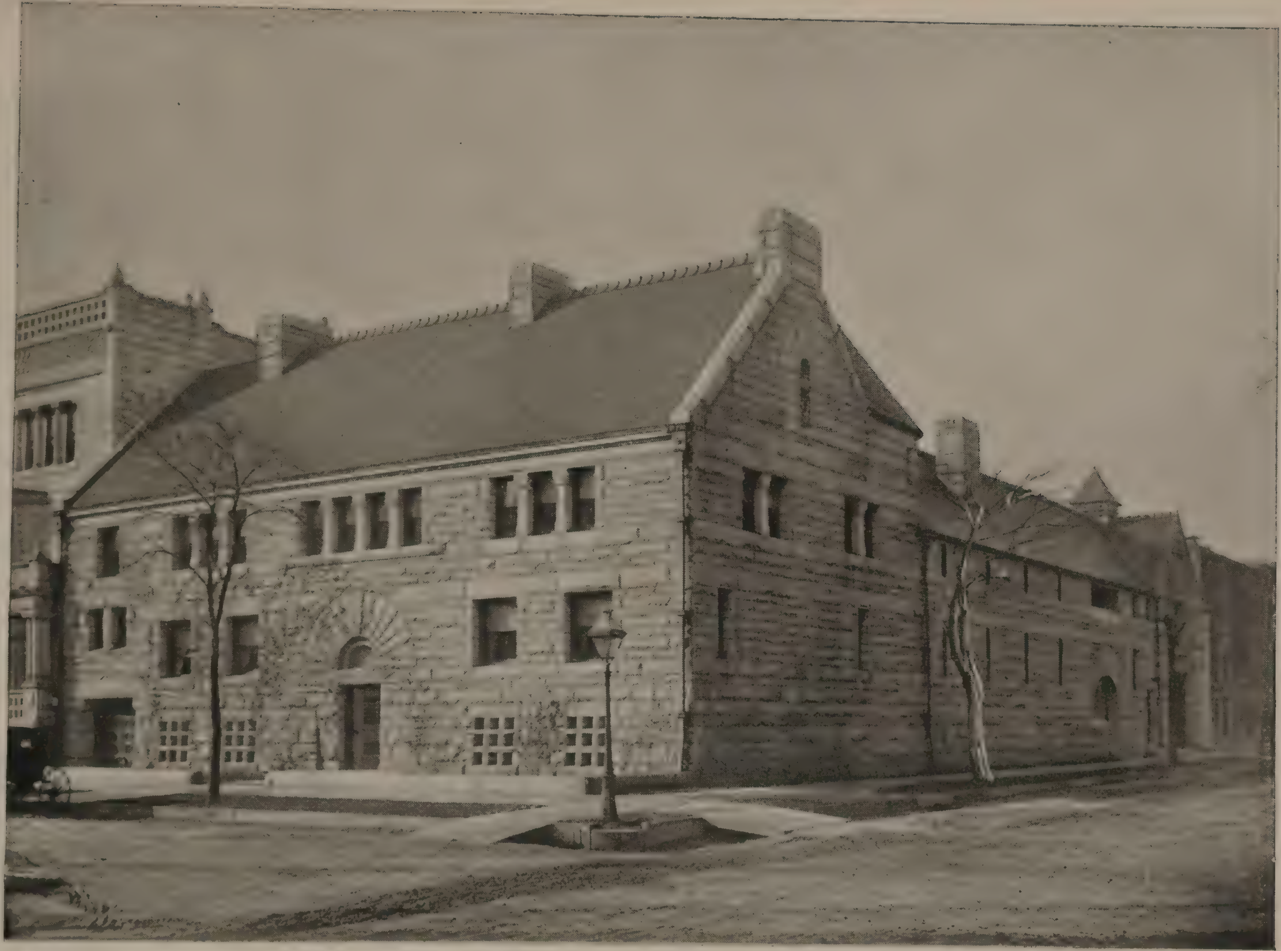


Chicago, Ill

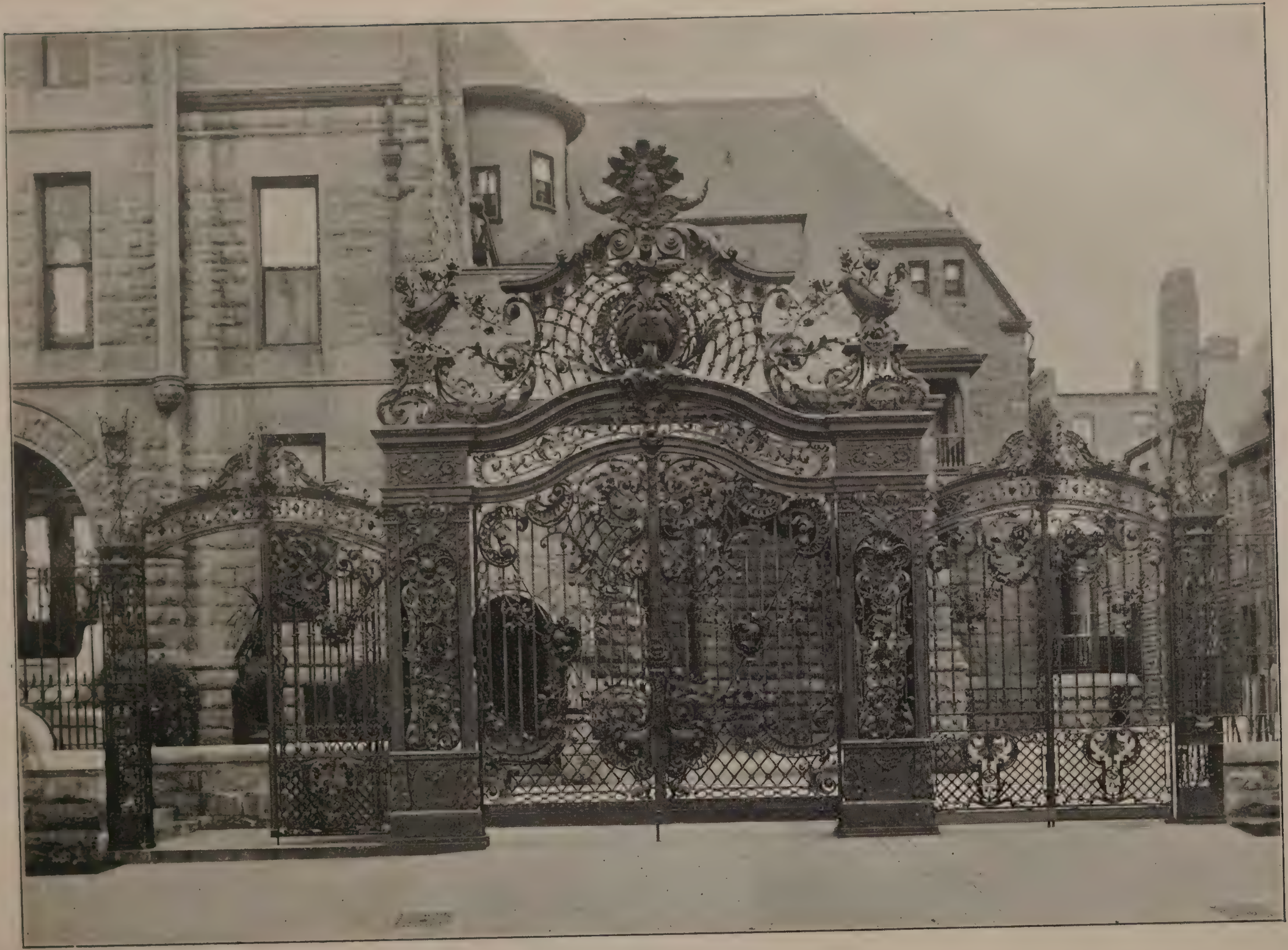
LIBRARY IN THE PRESIDENT'S HOUSE.

(Chicago University.)

Henry Ives Cobb, Architect.



Chicago, Ill. RESIDENCE OF J. J. GLESSNER. H. H. Richardson, Architect.



WROUGHT-IRON GATEWAY.
Designed and Executed by Winslow Bros. Company.

NEW BOOKS.

London Churches of the Seventeenth and Eighteenth Centuries. A selection of the most remarkable ecclesiastical buildings, including St. Paul's Cathedral, erected within and around the ancient city walls between the years 1630 and 1730, from the designs of Inigo Jones, Sir Christopher Wren, Nicholas Hawksmoor and James Gibbs. A series of sixty-four plates, and numerous other illustrations. With historical and descriptive accounts, by George H. Birch, F. S. A. London : B. T. Batsford. 1896. Folio, pp. xvii , 165.

This book is noteworthy as being a nearly exhaustive treatment of an important subject. For convenience it may be considered as consisting of two parts ; first, twelve plates, a number of text illustrations, and twenty-four folio pages less those illustrations, all devoted to S. Paul's Cathedral ; second, fifty-two plates with text and text illustrations proportionately devoted to thirty-five of the minor churches of the metropolis, with some remarks upon a score of those not thought worthy of more ample treatment. This division into two chief parts is worth insisting on, because the importance of the cathedral is so much greater than that of all the small churches in London of the epoch covered by this volume, even when taken in the aggregate and presented together, for comparative study, as here. The cathedral is one of the three or four most important structures, artistically speaking, of the years since the decline of the early and original Renaissance, but no importance at all comparable to this can be predicated of the churches, singly or collectively.

The large plates are of surprising importance. Mr. Charles Latham, the photographer, is well known to those who have studied on the spot the architecture of the south of England and who have needed the aid of an artistic and skilful maker of architectural views and details, but even his previous record seems to be surpassed by these extraordinary pictures. The interiors are especially noteworthy. S. Paul's Cathedral is unusually well lighted, of course ; but still, to produce these views of the interior under the dome from two different points of the south aisle and nave looking westward, of the northwest chapel, of the choir aisle, of the choir stalls, the Bishop's throne with the splendid iron gate which forms the south entrance to the choir, and finally the organ case, is to achieve something admirable in the way of photography. There is a fine interior view of S. Catherine Cree; four views of S. Stephen, Walbrook, besides one of the dome taken vertically from below; two of S. Mary-at-Hill, one of S. James, Garlick Hithe; two, more in detail than for general effect, of S. Lawrence, Jewry; one of S. Nicholas Cole Abbey, one of S. Swithin and one of S. Bride, two of S. Clement Danes, about the name of which interesting church authorities differ, as there are those who insist that it should read S. Clement's Danes, that is to say the Danes of S. Clement, and eleven more interior views of equal importance taken together, besides some pictures of curious details which carry with them general views of greater or less extent. In all this series of pictures taken within doors,—an unusually extensive series as any one who knows architectural books will admit,—there is no sign of the artist having met with serious difficulties, nothing of importance lost in darkness, nothing made ugly and unsightly by disagreeable effect of light and shade except where in minor details the uncompromising shadow thrown by a pulpit or a font, which receives light from a single window only, must needs swallow up what comes within it. There are two or three interior views given in half-tones in the body of the text which should be mentioned as showing the general wealth of illustration. One of these, on p. 132, without being at all pleasing is easy to understand and is a really valuable picture. To return to the large plates ; the font cover in the church of Allhallows, Barkng, a piece of carving in oak of Grinling Gibbons' time, if not certainly by his hand, is as fine a piece of decorative art as one is likely to meet with in an architectural book. and the wrought-iron sword rests and hat-racks of 1726 and following years are even more important to the student as being more unusual and more stimulating in their character. These are plates 63 and 64, and form a sort of appendix to the book, but other such minor objects of ornamental art occur in many of the plates, and here again it must be mentioned that the text furnishes us with small prints, photographic and other, of sword rests, hat stands, fonts and font covers, pulpits, and even large and semi-architectural altar pieces like that at S. Vedast's Church.

Admiration has been expressed above of the brilliancy of these interior photographic views. It will be urged that the glass in the London churches is not generally very rich or dark and that the interiors are thoroughly lighted, as thoroughly as the atmosphere of London allows ; and that is true, but how about the atmosphere of London? This brings us to the question of the exterior views and to the fact that these show a uniformly gray sky, a dull and smoky air, a complete absence of the effects of sunshine. These pictures are nearly all of steeples, as indeed the steeples are the pride and glory of the special admirers of Wren, and yet these pictures of the upper air, where spire shows beyond spire in fortunate groupings, with the dome of S. Paul's, perhaps, looming hazy in the far distance, have in them fully as much the effect of pale and generally diffused light as that of the interiors themselves. And the conclusion is that this is the photographer's art—his fine art, or one phase of it. Just as the selected point of view is generally most fortunate and conveys strongly the idea of infinite trouble taken and of innumerable difficulties overcome, just so the reduction of all these photogravures to the same gray uniformity gives a strong idea of a deliberate choice of effect having controlled them all. It is curious to see that no view of either flank of S. Paul's has been obtainable. There is, indeed. among the large plates a view of the south transept from the southwest. One of the same transept from the southeast, with a little of the south aisle and the great south chapel showing beyond, has not been given us in photogravure, and the half tone is inadequate. The flanks of the church are of course almost inaccessible to one who must have a few yards of distance for his point of view. The same conditions exist with regard to the smaller churches, and it is therefore fortunate that we get what is best in these churches when we get so much of the steeple as rises above the roofs around. The spire of S. Bride, Fleet street, and that of S. Leonard, Shoreditch, and S. Giles-in-the-Fields, and that of Christ Church, Newgate, and that of S. Magnus, London Bridge, and that of S. Mary-le-Bow, and that of S Stephen, Walbrook, rise clear of all surrounding buildings.

That of S. James, Garlick Hithe, not a very lofty or aspiring structure, is dominated by the great dome of S. Paul's five hundred yards away to the northwest. Beyond the steeple of S. Clement Danes is seen the great irregular and unorganized mass of the London Law Courts, with its courts and gardens seen in bird's-eye view. The photogragher might in this case have obtained a view from below ; namely, from those very courts and gardens ; but preferred, wisely, to remain in the air among the steeples and not to break into his system or destroy the uniformity of his plan with regard to the steeples in question. That of S. Vedast Foster is a little overpowered by S. Mary-le-Bow seen a quarter of a mile distant. Finally, the churches of S. George, Bloomsbury, S. Martin-in-the-Fields, and S. Mary-le-Strand, are given complete, at least as far as one point of view allows ; and so is Christ Church, Spitalfields, though this is too hideous to be allowed so fine a plate.

An article in the last number of this journal, and devoted to Mr. Daniell's interesting book on *London City Churches*, has said what needed to be said about those buildings, considered as architectural monuments, with one exception. The steeples, however low their average of size and dignity, contrast with those of the continent in being nearly all of the refined and severe rather than of the fantastic variety of the later revived classic. The strong existing tendency toward building in the "high Roman fashion," or in what the designers suppose to be that fashion, leads towards churches as well as civic buildings, and students of church architecture in the columnar style may certainly learn from these examples left them by Wren, Gibbs and Hawksmoor. S. George's, Bloomsbury, has been stripped of the strange monsters which once gave a heraldic character to its odd pyramid, but the lovers of classic architecture will prefer it as the restorer has left it. Including this one, there are a dozen towers given in these plates, all crowned with spires or lanterns, all classical in detail without *barocque* extravagances and all worthy of study. To these may be added at least one steeple, which is given only in a small elevation in the text—that of S. Antholin, Budge Row.

The text illustrations include plans of nearly all the churches, and the towers of several; but sections of the churches and other constructional drawings are very uncommon. Architects will regret this, for it would be curious to know how these groined and barrel vaults, these cupolas and pendentives, are shaped out of wood and plaster and hung from the roof timbers. On the other hand, what is more important in London churches than their sham vaults, namely, their monuments and memorial tablets, are given rather freely, and often with carefully drawn details, such as sections and profiles of their mouldings. The fine oak carving, too, which in some cases decorates the apparently constructional parts, is illustrated in some of the plates and drawings.

To turn now to the monograph on S. Paul's Cathedral; it is not long and does not profess to be technical, but it is full of interesting facts and contains some valuable suggestions as to plan and design. The serious fault of S. Paul's, the one unforgivable sin committed by its designer, namely, the erection of the second story with a second order concealing the clear-story and denying the fact that there is a clear-story rising above aisle-roofs—this the author does not mention, absorbed as he is in consideration of the interior. This interior, which is really one of the finest things in neo-classic art, Mr. Birch judges wisely and writes of critically. He puts his finger on the one serious fault it has, "the four subsidiary arches of the dome, where the arch breaks into the entablature, dividing it up into detached pieces." Otherwise his warm praise of the interior everyone can sympathize with, and it is not necessary to look too closely into his restatement of the queer arguments that Englishmen are fond of about the superiorities of the London church over S. Peter's at Rome. That the interior, in its nave and aisles, choir and transept, is really far finer as a piece of refined architecture than the interior of S. Peter's, judged in the same way, can hardly be questioned.

A Hand book of Greek Sculpture. By Ernest Arthur Gardner, M. A. Macmillan & Co., London, and 66 Fifth avenue, New York. 1896. Pp. xvi., 268. Price, $1.25.

Here is at last what has been needed; a brief account of what is really known of Greek sculpture, carefully distinguished from what is inferred, what is suggested, and what is supposed. The tone of careful and conscientious agnosticism is admirable and most praiseworthy. Bold suggestions, which as the discussion goes on become more and more assumption, the apparent truth of the theory growing continually into positive truth in the eyes of its advocate, may have their place in detail works on individual monuments of art, or on separate schools. They are dangerous even there; but without them progress in research would be more difficult. Even there; even in the books of archæologists addressing archæologists we have too much of quiet assumption that what seems probable is certainly true. In the hand-book addressed to the student at the beginning of his studies and to the public of persons interested who are only students for the occasion, this taking things for granted is to be most carefully avoided; and yet it is in just these hand-books that we find the almost universal dogmatic assertion and the rare suggestion of any uncertainty. The value in a book for beginners of this tone of tentative explanation is seen by contrast in the confidence the reader may feel in positive assertions when they are made. For instance, in the description, pp. 254–258, of the two statuettes generally assumed to be copies of the lost Athena Parthenos, the lost gold and ivory statue of Phidias, it is a satisfaction to see that here the author's unwillingness to be certain disappears, and to infer from this that there is reason enough for the universal agreement that both the Varvakeion statuette and the Lenormant statuette are really copies, however wretched in artistic style, of the masterpiece. So in the account, pp. 157–160, of the painted limestone sculptures found in 1884 and the following years on the Acropolis, the confirmation by the present author of the restorations made by putting together fragments, is a help to every student. It is clear gain that Mr. Gardner should have indorsed them.

In his careful and reserved way of treating attributions, Mr. Gardner is of the best modern school and he is of this school equally in the frank acceptance of the novel facts which are fairly established. Thus the account of the extraordinary collection of painted statues in the Acropolis Museum at Athens, some of which were found in 1882–3, some in 1884, and the greater number in 1886, is as decided in its expression of the entirely chromatic character of these sculptures as could be asked of the most hearty advocate of polychromatic sculpture, ancient or modern. He is talking of sculptures worked in soft and coarse-grained stone, and he says: "The surface of this coarse stone was always covered by a thick layer of paint, and thus the sculptures executed in it are to be distinguished from those made in any material meant to show. As the color has to a great extent disappeared, what we now possess must be regarded merely as the core upon which the visible surface was to be overlaid. Before judging artistically of any such work, we must restore in our imagination, with the help of the vestiges of color that still remain, the varied polychromy of its original state. When thus considered, it resembles work in glazed or enameled brick or in painted terra cotta, rather than any sculpture in stone or marble with which we are familiar." That, now, is exactly accurate. The few pieces of full colored sculpture which have been made in recent times, such as the monument to the Prince of Kohlapore and the chromatic busts by Charles Cordier, cannot be said to be "familiar." The heads of the Hydra in the Hercules relief were as brilliant a green when first found as a Chinese vase. The beards of the Typhon's three heads were of a gorgeous blue in 1884 and perhaps are so still. And on page 161 we come upon the suggestion that this blue is intended as a "conventional substitute for black;" and this will do very well because it is not improbable that a solid black over a surface as large as that of these beards and of the horses mentioned by Mr. Gardner would have been felt to be a deformity in a chromatic design. The fascination of the subject leads us away from our theme and on to the painted marble statues found also on the Acropolis and in the same years which are mentioned above. Mr. Gilliéron made admirably careful water-color drawings of these; their resemblance is really startling and one or two have been published in the Antike Denkmaeler while a nearly complete set is to be found in the Boston Museum af Fine Arts. The account of these and the critical examination given to them occupies the ten pages, beginning at page 164; and this is first rate artistic criticism as well as archæology.

The introduction, containing 44 pages, is devoted to the discussion of the sources of our knowledge, literary and monumental; to the materials and processes; to a brief summing up of the different characters and of the different associations of Greek sculpture; and to the chronological division of the subject. Now, it is in such preemptory statement as an introduction like this requires that what seem errors are to be looked for. Accordingly there is to be found in the third of the divisions above described, that the assumed relation of sculpture to architecture would have to be reconsidered very carefully before it would commend itself to the student of decorative architecture or of architecture and sculpture taken together. There is, for instance, page 36, the curious assumption, that not only Greek architecture does generally avoid sculptural decoration, but also that it ought to do so, in all "those parts of a building. which are essentfal to its structure or stability. In the columns for example, and the architrave which rests upon them, we see the fundamental forms of Greek architecture; and to weaken these in appearance by carving is clearly inappropriate." In this passage there are indications of a very questionable view of the whole subject. The very next sentence mentions the Assos Epistyle and the Ephesus columns as exceptions to this assumed general rule. Now in these cases the sculpture is in relief upon the broad surface of the marble lintel and the lower drums of immense marble columns; it is not in sunken panels but projects from the main exterior face which would have been the usual flat or rounded surface of the architectural member but for these unusual reliefs. In either case can these added embossings be said to weaken the member which they adorn. It is of course a fact that the working parts of a Greek building are less often richly sculptured; the exceptions being mainly the richer Ionic and the Corinthian capitals which do not come within the limits of "sculpture" as Mr. Gardner is using the term. It is equally a fact that sculpture in relief is applied chiefly to metopes which have no constructional work to do and that sculpture in the round is chiefly set up in the panels of the pediments or on the edge of the roof, standing upon the geison and the acroteria as upon shelves. The distinction between this absolutely free sculpture of the pediments and the roofs and the relief-sculpture of other parts does not seem to have struck Mr. Gardner and yet it is essential. The necessary examination into the question, how far the Greeks used architectural sculpture at all, has been avoided by Mr. Gardner, and while this is a natural and obvious expedient in the attempt to write a small book on a very great subject it is none the less to be regretted.

The small volume before us deals only with the introductory matter, as above described, and with early sculpture down to the time of Phidias.

The text stops abruptly in the middle of Chapter III. The second part is to comprise all the rest of the story, including Græco-Roman sculpture, and it is to be hoped that a somewhat larger volume will be given. The one subject of Græco-Roman sculpture in the hands of so judicious a critic is to be looked for impatiently, and is needed as what has never yet been given to the student.

Early Rhode Island Houses. An Historical and Architectural Study by Norman M. Isham, A. M., Instructor in Architecture, Brown University, and Albert F. Brown, architect. Preston and Rounds, Providence, R. I. 1895. Small quarto; pp. 100, and 60 plates serving as appendix.

The Old Colonial architecture, of which so much is said and written, is a somewhat elegant and town-bred style. It has a great deal of added decoration; porticos of columns, rows of pilasters, pediments at the roof-gables and frontons over doors and windows; and indoors a very handsome show of ornament modelled in plaster or carved in wood. It is, in short, a modification of the more elegant style of the time of George II., or even in some cases of an earlier style than that. It is traditional only in the sense that its way of working and its manner of design were brought from England by men who had used it there. It is really the architecture of the London studios; a reflex of the work of professional architects.

There is, however, another Old Colonial which is traditional in a truer sense. The very clever writer who has furnished the account of English architecture for Planat's *Encyclopédie de l'architecture et de la construction* insists upon the radical difference which he finds between the native English architecture which lingered on long after the Middle Ages through the reigns of the Stuarts and into the "teacup" times of the Hanoverians—which was handed down from father to son and for which no architect made plans—between this native and traditional building, and the sophisticated and self-conscious art imported from Italy in the volumes of Palladio. The first, he thinks, was the building of the conquered English and the latter the art of the Norman conquerors; that is to say, of their descendants in each case.

The half-timbered house with overhanging upper stories, gables, wooden verge-boards, small and narrow windows grouped in threes and fives, and deep enclosed porches; this was the lingering mediæval and purely English feeling showing itself in the mediæval forms but slightly modified. Even when it was a spacious and a many-windowed manor-house, it was still the building of country-side traditions and untraveled simplicity. The architecture of colonnades and classical proportions, in which the country mansion seems to put on a London look is that of the court noble, a member of the privy council, the man with the traditions of the followers of William the Conqueror. This may be fanciful enough as a theory of origin, though indeed there are suggestions within it; but it is simple truth that the two styles exist side by side, as late at least as the early years of the eighteenth century. And it is simple truth that both these styles came to this country, and that relics of both are still to be found here. The earlier to manifest itself was the more popular and purely traditional style, and this because it was the humbler and poorer houses that were built.

It is these houses; it is this simple and traditional style which Messrs. Isham & Brown have reported upon in the volume before us, adding to our slight knowledge of American early building the contents of an admirable monograph on one little corner of the country. The oldest Rhode Island houses are of the forty years from 1636 to 1675; there are only two of them, one in Providence and one in Cranston. There are only five left of the last quarter of the seventeenth century. In all of these, alterations have been made which change the original character very greatly, or else they are in ruins. All contain masonwork and woodwork worthy of that close and accurate study which our authors, with the aid of Mr. Edward Field, the Record Commissioner of Providence, have given to them. The drawings are minutely careful, plotted and figured with obviously ideal accuracy; and small perspective sketches of parts of the framing, ironwork, sashes and chimney top, are put in on the margins or are on separate leaves. In all this there is nothing of the Palladian architect or of the architect of any sort, as the seventeenth century knew that being, then newly recognized in England and her colonies.

Here are the posts more nearly square in the main, broadening out to twice their width in one direction where they have the ends of girders to carry, the posts spreading out into a pair of corbels where they are needed. Here are the corner posts of the overhang, shaped at the lower end into a graceful enough "drop" or pendant. Here is chamfering of many kinds and of many sections, some of it moulded with elaboration and nearly all of it worked with spirited stops.

In short, here is the English house-carpenters traditional work shaped out of mediæval forms by passing through the century of Elizabeth and James, but mediæval still in its shapes and ways. With this is a little ornamental mason-work, admirable chimney tops with decoration in brick pilaster-like breaks and simple stepped-out caps.

Then come the houses of the third period embracing the first quarter of the eighteenth century; one in Providence, one in North Providence, one in Johnston where the famous elm tree is, immortalized by the Autocrat, and one in Buttonwoods where there ought to be some good trees. These houses are somewhat larger; one of them has formidably high and sharp gables, but the same system of building with all the larger timbers exposed indoors goes through them all.

The chapters on "Construction," and on the "Relation of Colonial Architecture to English Work" explains precisely how the American clapboarded exteriors are to be accounted for. The old houses were built at first as their models in England had been built, the timber framing showing on the exterior and the spaces between the timbers filled with rough brick and mortar masonry or with "wattle and daub," but the sun of the summer shrunk the timbers and the cold and snow of the first winter found easy entrance, and clapboards were called for.

Chapters V. and VI. deal with the towns of Newport and Narragansett, which have not been dwelt on in the previous pages; and some larger houses are described here, of which one at least is quite a mansion in its exterior effect and its accommodations.

Plate I. gives a curious record in eight figures of the development of the Rhode Island plan, in two directions, out of one-roomed houses with end chimneys ; one of these along the line of chimneys in the outer wall becoming more and more elaborate with fireplaces and flues; the other through the well-known New England middle-chimney house, with its staircase in the front lobby and backed up by the great stone mass of the chimney. Plate II. is a curious map of Providence as it was in the seventeenth century, with the names of the residents appended to their houses, some of which houses are preserved in the plates of this book. In a pocket of the cover is an almost equally attractive map of the State of Rhode Island at an unnamed early date.

Enough has been said to show how interesting and how valuable a book we have in this small quarto. It is to be hoped that the work will be pushed on by the same enthusiastic students. They have given us here what we take to be the most important contribution so far made to the history of American art, and it will be a pity if their work stops here.

A Text-Book of the History of Architecture. By A. D. F. Hamlin, A. M., Adjunct Professor of Architecture in the School of Mines, Columbia College. Longmans, Green & Co., New York. 1896. Pp. xxv., 441 ; 229 illustrations in the text. Price, $2.00.

To the student outside of the class-room it may well appear that the chief value of this book is in its tables of monuments and dates and its brief lists of books preceding the different chapters. That is to say, it will appear on first examination to be a book of reference rather than a book to read. This, however, will be a mistaken idea and one that the reader of this notice is advised not to entertain.

Some of us are convinced that the history of art is more likely to be written as it should be written, by Americans than by the scholars of any European nation. The monographs will of course be by Europeans, in almost every instance. In Europe are the traditions ; there are the scholarships, the Professorships and the Fellowships ; the habit among men of some leisure of devoting their time and energies to specialized study. Few are the Americans who come into the field of scholarship prepared to vie with their brothers of Western Europe in this matter of minute and continued research. But in the way of summing up the conclusions and the making history out of detached historical facts, the American has an advantage, which is greater than at first sight seems possible, in his capacity of treating with equal comparative respect the researches of men of all nationalities. It is strange, but it is true, that very few books published in Europe are free from vexatious instances of national pride interfering with the historical sense. The tendency which leads to such phrases as "Our History," —"with us, it has not been so,"—"we were enabled to repel the invasion,"—and the like, recurring again and again in the gravest historical works and in all languages, is an example of the nationalizing spirit to which we refer. In treatises on architecture this is as prominent and as visible as in political and social history, and nothing is more ludicrous than the never-ending troubles of the would-be historian of architecture to explain to his readers, assumed to be his countrymen, that after all and in spite of everything his and their country leads the field. The only nation of Western Europe which may be supposed free from this curious ambition is the Swiss nation, and the Swiss history of European architecture we are yet to receive.

Mr. Hamlin's text shows very neatly the unbiased kind of judgment which we expect from the future American historian of art. It is not merely that he is indifferent what nation or people is proved to be the inventor of this style or that, his unprejudiced largeness of view enables him to see the essential tendencies at work in each epoch and every land. The few words allowed to each branch of the subject as treated in this very small book are the right words nearly always. It would make our readers laugh if there were printed here the statements which we mark as perhaps erroneous, so few they are and so trivial. Such brief treatment can never be very interesting reading, at least to the comparatively uninformed reader, but such readers may be advised safely to learn by heart each chapter on European architecture and then look at all photographs they can find, belonging to that epoch, with the certainty that these will have a new meaning to them. As to the architecture of the far East, the subject has as yet been too little studied to make it safe to write hand-books about it, and as to the Mohammedan architecture treated in Chapter XII., Professor Hamlin perhaps overrates its importance. In India only is Mohammedan architecture of any great comparative value.

A History of Architecture for the Student, Craftsman and Amateur. Being a Comparative View of the Historical Styles from the Earliest Period. By Banister Fletcher, F. R. I. B. A., Professor of Architecture in King's College, London, and Banister F. Fletcher, A. R. I. B. A., Instructor in the Architectural Studio, King's College, London. With 115 plates, mostly Collotypes, and other illustrations in the text. B. T. Batsford, London. 1896. Imported by Charles Scribner's Sons, New York. Small octavo, pp. xvi., 313. Price $4.50.

This is a small and thin hand-book, swelled by the insertion of 115 plates on thick paper to the form of one of those "dumpy" bibles which Englishmen loved in the seventeenth century. The plates are really of importance in any estimate of the book, for although such collotypes as can be printed on a page four and one-half by seven inches cannot be wholly satisfactory, yet a series of well-selected pictures, including some plans and some measured details, but generally made up of photographic views, has an inherent value which is not to be mistaken. The selection of buildings is indeed very good. There are not as many interiors as could be wished, but there are some which it is really a pleasure to see in a popular book of this kind. It is hard to make them tell in small photographic process plates. It seems that to provide a good interior view for a book recourse must be had to large and costly plates, such as those described in another page as illustrating Mr. Birch's book, or else drawings made by hand in which of course the draughtsman's personality comes between the builder and the student. Thus the views of the interiors of S. Sophia at Constantinople, S. Mark's of Venice, and S. Peter's of Rome, are of little avail to the student, but the Basilica of S. Maria Maggiore and the Cathedral of Pisa have simpler interiors which the lack of distinctness does not so greatly injure, and the vaulted roof of Henry the Seventh's Chapel, as a large-scale detail is easy to render and is a very useful illustration. The exterior views serve their turn well. It is pleasant to find among them several fine buildings which are not known as well as they should be, such as the south front of Hatfield House, which is certainly one of the best pieces of Renaissance designing, properly so-called, in all the North of Europe, the admirable Town Hall at Antwerp, and the Paris Pantheon, so given as to show its windowless walls. There are some Spanish examples too, which, though less unknown than they were fifteen years ago are still less familiar than they should be; and the interior of San Juan de los Reyes at Toledo is well-worthy to be chosen on account of its interesting management of the central tower as seen from within. This should be compared with the simlar and better known example of Burgos Cathedral, and these two plates are given in 114 and 115.

The text of this work is arranged rather for reference than for reading. A large part of it is devoted to elaborate comparisons between styles. Announcement is made on the page facing page one, that each style is considered in five different ways; first, as to the Influences,—Geographical, Geological, Climatic, Religious, Socio-Political and Historical,—which have shaped it; second, as to its Architectural Character; third, as to the Buildings, which serve as examples of it; fourth, as to the Comparison of each with other styles; and fifth, as to the Books which may be consulted. The reduction of a complex and subtile theme, such as the critical history of architecture, to a series of brief and positive statements, brings with it this danger, that statements will often be made which cannot be perfectly maintained This danger is greatly increased when much is made of the influences of race, climate and religion. The working of these influences is so very hard to trace and is so tempting to the bold theorizer, that the student should always be warned against architectural conclusions founded upon such non-architectural reasoning.

Evolution in Art, as Illustrated by the Life-Histories of Designs. By Alfred C. Haddon, Professor of Zoology, Royal College of Science, Dublin; Corresponding Member of the Italian Society of Anthropology, etc. With 8 plates and 130 figures in the text. London: Walter Scott, Ltd., 1895. Imported by Charles Scribner's Sons, New York. Pp. xviii., 364. Price, $1.25.

This volume is one of the Contemporary Science Series, edited by Havelock Ellis. It consists of an introduction and four principal divisions, which, in their turn, are subdivided. Thus the first of the main divisions is devoted to the art of British New Guinea, considered as an example of the method of study to be followed, and this part of the book is subdivided as follows: I., Torres Straits and Daudai; II., III., IV. and V., Other geographical subdivisions; VI., Relation of the decorative art to the ethnology of British New Guinea; and VII., Note on the scroll designs of British New Guinea. The second main division is entitled "The Material of which Patterns are Made," and the third and fourth are, respectively, "The Reasons for which Objects are Decorated" and "The Scientific Method of Studying Decorative Art." The purpose and intent of the book is obviously and avowedly to approach the study of anthropology through the investigation of those ornamental patterns and those rude works of representative art which savages not of the lowest condition produce in great abundance. It is found that certain figures in ornamental patterns resemble certain objects, necessarily well known to the savages who have produced those patterns. There is then the natural disposition on the part of the investigator to infer that those figures are copied from the objects in question. Now, this inference is of different degrees of reasonableness in the different cases given. There can be no doubt, when a part of the human face is indicated by strongly marked lines, what those indications mean, and the scientific students of pattern-designing among savages have a perfect right to lay side by side patterns which show a continuous gradual divergence from the perfectly well marked human face to figures which have but little resemblance to the first, and which seem, when taken separately, not to be derived from natural forms at all. The case is different when the triangles in a complicated geometrical pattern are stated to be copies of a garment used by the women. Once in the hands of a decorative designer, one triangle is much like another. The use of this figure may be in any given case suggested by a garment or the shape of a fish, or by the spaces left between blades of a shark-tooth weapon, or by the interstices in a zig-zag; while the zig-zag itself comes natural and unbidden to every idle man who has drawn two nearly parallel lines, on the sand or elsewhere, and who scrawls between them.

The truth is that study of decorative art and its origin is as yet in its infancy, and is likely to remain there until persons having a practical knowledge of decorative design shall devote themselves to the scientific study of it. The fact well known to all students of fine art that the arts which appeal to the eye are nearly always misjudged by students in other departments, greatly retards advance in the branch of anthropology under consideration. The literary student and the scientific student insist on judging works of that fine art which appeals to the eye from literary and scientific standpoints. They are not to be blamed, for it is rarely seen that a master of the graphic and plastic arts, one knowing their theory in practice well, writes with any fullness, or indeed gives any attention whatever to research in the mysteries of primal decorative art. It fails to interest him, just as the rudest compositions in verse fail to interest the enthusiastic student of the loftiest poetry. Occasionally and incidently the man who knows and lives with that art which is the most highly developed and most stimulating may turn to consider the earliest gross and feeble strivings of undeveloped humanity, but continued and comparative study of them is not his to undertake. Those who accumulate facts relating to this novel subject of study and who reason upon them are nearly always persons to whom fine art is a sealed book. This, indeed, is indicated in the Introduction, where it is stated that the facts are collected in large numbers "by missionaries and others or seen in large ethnographical collections." Therefore, for years to come books will be written which, like this one, are full of suggestion, but which will mislead at times by assuming as true that which every advanced student of decorative and representative art knows to be false or extremely improbable. This book and Mr. Balfour's interesting little treatise, "The Evolution of Decorative Art," are important and praiseworthy attempts at laying the foundations of a study which may prove to be, in the future, mainly scientific or mainly philosophical. In the meantime its proceedings are scientific in their character, pursued along the lines of direct observation and comparison of facts and that is well.

The Ecclesiastical Architecture of Scotland, from the Earliest Christian Times to the Seventeenth Century. By David Macgibbon and Thomas Ross. Edinburgh: David Douglas. 1896. Vol. I., pp. xiii., 483.

The authors of this book are also the authors of "The Castellated and Domestic Architecture of Scotland" in five volumes, which came out three or four years ago, and is one of the most interesting and valuable of modern books on architecture. Mr. Macgibbon is by himself the author of "The Architecture of Provence and the Riviera," which was published in 1888, and which is a book to class with Butler's "Coptic Churches of Egypt" and Jackson's "Dalmatia, The Quarnero and Istria," as a product of personal experiences and minute observation. These octavo volumes printed in large type and illustrated, and yet sufficiently light in the hand, have a peculiar value to busy students; especially when illustrated as fully as those of our present authors. Architects in particular not gifted with much leisure for patient and long continued archæological studies should find books of this form peculiarly valuable—for who reads or can read the pages of a folio? The mere fact that there is never a table free to receive it destroys the value of a folio except as a book of plates.

Of these octavo volumes, then, devoted to the personal study of architectural subjects, eleven have been cited and Messrs. Macgibbon & Ross are preparing to give us three or four volumes more; and those upon a subdivision of the history of architecture which many of our readers will think more immediately interesting than any of those which have been mentioned. The only drawback to Scottish ecclesiastical architecture, as a matter of pressing need to all students, is the fact that it has never been very splendid nor in the highest sense of the word original. No single style of the last importance has ever originated in Scotland, nor are its cathedrals very magnificent, nor its minor churches very rich in architectural design or in sculpture. This is made up for, very largely, by the fact that they are not restored. No where will the student find a larger amount, proportionately of absolutely unaltered and nearly uninjured work. Round arched and early Gothic is to be found in great abundance; central and later Gothic also with all their strange and quaint experiments in vaulting and attempts at getting sculptured decoration at small cost. Moreover, all this is found in a country, which abounds in stone, fit for delicate cutting and solid building, and most of it is intact and unrestored. The authors of this book have treated their subject as a series of monographs; long or short, according to the importance of the subject in each case. Thus, Dunfermline Abbey Church has nearly thirty pages devoted to it with no less than twenty-six illustrations, by means of which, with a little comparing and referring backwards and forwards, an excellent idea of the whole building with its almost unique buttress system is to be had. The first illustration among those referred to is a general plan of the buildings of the Abbey; several of the cuts give parts of the subordinate buildings and a reference on page 256 sends us back to the work on Castellated and Domestic Architecture for the Palace which was intimately connected with the structures of the Abbey. In like manner the church celebrated in song and story, as St. Magnus' Cathedral at Kirkwall, is described in twenty-four cuts and a proportionate number of pages of text. Whether we take Sir Walter Scott's view of the town of Kirkwall, as held in 1805, that Kirkwall was "fair," or his opinion as held in 1814,—after he had seen it,—

> "And needs must I stare
> When I think that in verse I have once called it *fair;*
> 'Tis a base little borough, both dirty and mean—
> There is nothing to hear and there's naught to be seen.'

we shall not find it hard to appraise the cathedral That, indeed, is a thing upon which Sir Walter was not highly qualified to speak; he lived and died before the dawn of the archæological day. The church is really a very interesting piece of Romanesque and Transitional architecture with Gothic vaulting of a simple type, but of an epoch nearly a century later than that of the walls which it surmounts and with a most interesting central tower in its original condition.

Some of those famous abbeys which we associate rather with England, and which are the best known of all mediæval buildings to many travelers and many lovers of the picturesque in architecture, are really "over the border." These, of course, are treated with proportionate care in the book before us. Thus Kelso Abbey Church is treated in twelve cuts and an interesting chapter of text; and this affords an opportunity to say that these ruined monastic buildings have never had justice done them by the archæologists. No one will suspect us of wishing to depreciate the admirable work done by Edmund Sharpe, but what he has done leaves still undone the much needed exact survey and measurement and exact setting down of the ruins as they stand. Let the future give us if it will, complete excavation and thorough resulting research; what is needed now and without delay is a trustworthy record of what exists above ground and within reach of a tape-measure and the camera-lucida. This work is in the way of being done by Messrs. Macgibbon and Ross, as may be seen in the monograph of Kelso and in those devoted to Dundrennan, Jedburgh, Kinloss and Dryburgh.

That which has been described is a part of the body of the work, and of this it should be said that it appears to be arranged in a sense chronologically. The transition from Celtic to Norman architecture is followed by the Norman, that is to say the Romanesque style, and that by the Transition style. The perfected and the later Gothic are left for future volumes, although, of course, the buildings treated in this volume contain many fragments of later architecture. There is a separate series of papers on the very early churches of the Orkney and the Shetland Islands, made up from plans and drawings, made forty years ago by Sir Henry Dryden. There is a similar treatise on the earliest ecclesiastical buildings of Scotland, derived from the studies of the late T. S. Muir, and attention is especially called to these as the work of an antiquary of extraordinary enthusiasm and trustworthy devotion. The fact is insisted on that these very early buildings have suffered very greatly since the drawings and measurements in question were made from them. An introduction gives an account which is well worth reading, of the evolution of European architecture during about 400 years, namely, from 1050 to 1450 A. D., the years of the Romanesque architecture, the development of Gothic and its changes; English examples being always preferred.

Russell Sturgis.

CHAPEL IN CHATEAU D' ECOUEN.

To the Architect . . . .
. . . Builder and Owner

Before deciding upon your interior finish, consider the advantages of **MAHOGANY**— Beauty, Improvement with age; Increased value to property; bearing in mind the extra cost is only in the raw material. The **LABOR** —a large part of the cost, is the same in either case.

WM. E. UPTEGROVE & BRO.,

MAHOGANY MILLS,
Foot East 10th & 11th Sts.
NEW YORK

RED CEDAR for lining Closets, etc.

ALL KINDS OF

VENEERS AND CABINET WOODS.

The
Architectural Record.

VOL. VI. OCTOBER-DECEMBER, 1896. No. 2.

HOUSEHOLD FURNISHINGS.

IN that unbroken chain which connects the soul of man with the surface of the earth, furniture—which touches the house on one side and the body on the other—is an important link. The word is here used in the larger sense, covering all the household appliances, all movables, from the bedstead to the teaspoon. They are all part of the furnishing of the house; all serve for the extension of human power and activity, and all are evolved by the same great law which gives us feet to stand on and teeth to chew with. Let us follow for a moment the lines of development which have filled our moving wagons with household impedimenta.

It is in this field that we find most fully exemplified that marvelous advantage of the human creature who makes to himself innumerable ulterior conveniences in passive and active furniture; the writing desk, for instance, being passive and the pen active, and thereby multiplies and develops his power a thousandfold. All furniture is based on bodily needs, and its value is to be measured by its right meeting of those needs.

A chair is meant to sit on, and so rest the body without lowering it to the earth entirely; so saving the exertion of getting up again. It is safer, easier, cleaner than lying on the floor. Originally a mere stool, the back was added to further rest the trunk muscles and the arms.

The literal fact of furniture being an extension of the body is easily enough shown. The human body of to-day is so constituted as to be able to receive such and such sensations, perform such and such labors, sustain such and such stress. It is an instrument varying greatly from the body of the early savage, or of a lower animal. In some ways it is superior, in others inferior; such as it is, it is conditioned upon the furniture which allows its varied activities.

If the human hand had to do all the work itself, as the monkey's paw does, it would not be the human hand. If we dug with it, we should lose the finer susceptibilities of touch at once, and grow heavy claws. If we used it for spoon and fork, with teeth our only knives; if we were forced to do a tenth part of the day's work "with our bare hands," we should soon have no hands to do it with. They would lose the distinctive characteristics which make them hands. The infinite subtlety of development shown in the special tools of some trades, needles for instance, paint brushes and the exquisite subdivisions of a dentist's tiny instruments; these carry with them the hand of delicate and varied use. And were it not for such tools we should not have that hand as it is. The elephant's trunk and its one finger is a wonderful organ; the flea has a good outfit of vivisecting tools in its mouth; but there is nothing else in nature that ap-

Copyright, 1896, by The Architectural Record Company. All rights reserved.

proaches the human hand with its derivatives. That which makes it a hand instead of a paw is the capacity for varied use, and the capacity for varied use depends upon its tools. They are parts of the body, like patent detachable finger nails, transposable teeth and the like.

It is plain then, this being so, that the laws of construction, their use and beauty, must be considered in continuous regard to the human body. They have, of course, their own absolute condition beside; matters of durability have to be considered as well as adaptability, and the relative value of different materials.

To the household economist the chair represents so much physical rest, modified, of course, by personality; so much beauty of its own; so much relation to other articles associated with it, and so much durability. To the average purchaser a chair is not judged, surely, even by the first of these considerations, and the others are lost sight of altogether.

Our forefathers, who made things so strictly for use, and that in most cases governed as strictly by economy, missed but one factor of beauty, and that is ease. The beauty of any usable thing, from a leg to a ladle, is based on three conditions: use, ease and economy. "You must have something to stand on, must you?" says Nature. "Very well, here's a leg; doesn't work easily? I'll fix it." And forthwith she adds joints and kneepans and all manner of ropes and pulleys to make it go. Then when it is strong to stand on and easy to use, she shears off all superfluities and "behold how beautiful the limb is!"

The maker of the ladle is governed by the same considerations. It must be a perfect ladle to begin with; it must conform in every curve and line to the comfortable use of its holder, and it must have no needless weight or substance. Here is where certain ostentatious teaspoons fail of beauty; there is too much material for either our ease of use or their necessary durability. The pitcher that does not pour well cannot be beautiful, though of gold. The glass so frail that it needs to be under glass for protection, is not beautiful in common use; nor is the china whose easy use would be its sure destruction. The spider-legged table, and the insect family of chairs; the things that creak when you sit down and tip over when you get up, these are not beautiful.

If a thing is of a light and frail appearance, as a bamboo chair, it should be also so simple in construction as not to suggest waste labor. And if a thing is rich in inlaid work or carving, it should be solid enough to endure time and strain, else its beauty carries a constant element of distress and so ceases to be beauty.

Beauty, be it observed, is not by any means a "mere matter of opinion." Beauty has its laws and dies upon the infringement thereof. It is quite possible, of course, to believe an ugly thing to be beautiful, through association of ideas, false education, low perceptive faculties and the like; but because a thing seems to a person to be beautiful it does not by any means follow that it is so. Take, for instance, the African admiration for extremely fat women, the Chinese admiration for deformed feet, our own admiration for deformed waists; that a given object conveys pleasure to the eye by no means proves it beautiful. We Americans, as a whole, have a low national taste, and need much honest study before we can recognize true beauty. And even after we have learned a good deal about it, there remains the endlessly varied application according to our personal and industrial and social and economical limits. When it comes to house furniture, that, like home architecture, is modified by so many necessities as to make any clear high beauty impossible.

Suppose we begin to plan for parlor furniture: carpet, tables, chairs, sofas, curtains, etc. Everything has to be modified by many considerations. If it is a family room, it must not offend the personal taste of any member of the family. The varied use of every article by many people modifies its possibilities immensely. If there are boys, a certain grade of furnishing follows; if babies, another; if cats and dogs, another. Furnishing *depends*. It depends on so many things that we cannot hope for high beauty in the ordinary household; but still in certain rooms in some houses there might be noble furnishing; in others much that is pretty; and in all a harmony and sweet reasonableness, now almost unknown. It is quite possible also for each of us to learn to know good furniture when we see it, as well as good architecture, and if our household exigencies require cast-iron and tow-cloth things, to see to it that they be harmoniously constructed.

Let us consider in detail one article, say a chair. Being meant to support the weight of the human body, the chair's personal beauty requires that it shall show power to do this, and not greatly more. If a chair looks strong enough to support a weary elephant, it is not beautiful; nor if it looks as though a cat's weight would strain it. Support is the first requisite of a chair. After that the relative comfort of the support enters into the beauty of the chair. It must in all ways conform to its use. These demands complied with, it has minor considerations of its own. Not being always occupied, it should not be built so as to suggest too painfully the absent sitter, for a self-respecting chair has some character of its own. Grace and power in its lines, fine material, true decoration—these may make the chair a thing of beauty in itself even when empty. But none of these things must ever interfere with the comfort of the user, the chair's reason for being.

This reasoning holds good for every article of furniture. First, its use to man; second, its own laws of construction and decoration; third, and here only the individual can dictate, its relation to the thousand needs of household life. One generalization may be permitted on this line. Knowing that household needs are various any conflicting, and so require a low, common denominator, no article in a room should be of any marked eccentricity.

The private room may show more of this; but high specialization in furniture calls for the same specialization use, such as the peculiarly personal or professional use of the dentist's chair, barber's chair, invalid's chair. For household use certain low-toned harmonies are best; things restful, useful, quietly beautiful, not too pronounced. A Bengal tiger on a hearth rug, for instance, one of the favorite designs of rug in many middle-class English houses, can never be considered as soothing, and it is happily being replaced by something less suggestive of barbarism.

The background for all furnishing comes under the head of decoration, and is a study in itself. For the furniture itself there are always three principal considerations: (1) the size of the apartment in which it is to be placed; (2) the purpose of the room, and (3) the object or use of the articles themselves. To these considerations others must be made subservient.

There follow then certain practical considerations—the nature of the materials employed, mineral, vegetable and animal; their relative durability and destructibility. The nursery, for instance, or other room which children are to occupy with some sense of space and comfort, demands absolutely different treatment from that of the drawing-room given chiefly to the reception of guests. Until within a generation a "set" of furniture has been regarded as a necessity for a well-furnished parlor, and the average housekeeper, notably in New England, having little money to spend, invested it in hair-cloth, the most hideous as well as the most durable of all fabrics the mind of man has ever evolved. In its natural colors a species of iron-gray, it was a trifle less objectionable, but inscrutable desires on the part of the buyer brought the dyer to the front and gave inky and glossy blackness as the result. Repulsive in color, slippery in finish, to that degree that no mortal could do aught but slide uneasily on the cold ungracious surface, the New England mind seized upon this as the ideal, and for generations held to it with fervor. The "rep set" followed—usually dark green or red—and this was a great step forward. Gradually, with the slow development of a faint sense of beauty, cretonne and other fabrics have come into use, while the growing familiarity with Japanese and other Eastern fabrics is teaching us the value of an admixture of mineral materials, as gold, silver or copper thread.

The cottage requires a lighter order of furniture than the mansion; but this does not mean flimsiness of construction or poor material for covering. Wool invites moths, and in our furnace-heated houses where life is made easy for them, wool is always liable to their attacks. But there are beautiful combinations very durable in quality, in silk or cotton or linen, as well as in silk and wool. At this point one is tempted to take up room by room with the best type of furniture for each, but limitations of space make this impossible since each type of house must have its own standard. But there are good and helpful authorities all certain to develop taste and power of judgment in the buyer. Sir Charles Eastlake's "Hints on Household Taste," though one of the oldest, remains one of the best and most suggestive. Litchfield's "History of Furniture," a superbly-printed and illustrated volume, gives us the finest models from the Greek and Egyptian down, is much in the same lines as that of Jacquenart, while the recent volume on "Colonial Furniture," will enable even the unwary buyer to distinguish between Chippendale and its imitation. "The Magazine of Art," "The Art Journal," and a few other art periodicals often give elaborate descriptions of artistic furniture with illustrations, sometimes with schemes of furnishing adapted to varying purses.

Probably nothing can more thoroughly train the eye than a study of ancient models never excelled in either beauty or finish. The British Museum contains six chairs, the earliest examples of the ancient Egyptian theories, and all about the same height as our present chairs. A beautiful one is of ebony, turned in the lathe, and inlaid with collars and discs of ivory, the seat being heavy cane slightly hollowed. Another of turned and polished rosewood, has a seat of skin and folds precisely like our modern folding chair, but much more securely. They chose heads of animals for ornamentation as did the Assyrians, and their couches, tables and cupboards were all heavy, solid and finely carved, the seats being upholstered or embroidered with the richest materials. Both the Greeks and the Romans used folding chairs, carrying them in the chariot for use in the Forum lecture-halls and baths. Form and construction remained much the same, the Greek predominating, and perfection of finish being regarded as the first essential, being in each case according to the material employed.

The renaissance in art made great changes in architecture, and all this transition was exemplified in the furniture. The princes and nobles of Rome, Florence, Venice and Milan ordered and often designed the most sumptuous chairs and tables, cabinets, beds and chests, and as an almost uniform training was given the artists who resorted from Italy, the work done by them in Spain, Flanders and Germany, especially under the reign of Charles the Fifth, can hardly be distinguished from that of Italian artists in the same period. The beauty of this sixteenth century work, however, declined in the seventeenth century—nor has it had serious attempt at reproduction until the present day, when fixed and often most unlovely forms are giving place to genuine artistic designs.

The construction of a perfect chair means many things. Each part should be as perfectly united to the next as if it had grown in its place; and this means well-seasoned wood, exactly cut tenons and mortices, very hot glue of the best quality, and the proper pressure in putting it together. Lightness for ease in moving is another requisite. If carving is used, it should be absolutely subordinate to the outline and comfort of the sitter, never interfering with the dress, nor being liable to breakage from having salient points, masses or ornaments exposed. The same general laws apply to couches and beds, and the ancients worked them out at once, held to them rigorously, and would look with consternation at our veneered, warped, mis-shapen products, made to sell, and utterly cheap and mean in expression.

The sensative touch of the human hand must be in anything that holds high artistic quality, and the factory can never give us distinctive work. As we learn once more this law known thousands of years ago, each of us will want at least one piece of furniture designed by an artist—by ourselves if we have artistic perception—and in time we shall all return to the earlier ideals, learn the place of ornament, and gain once more a distinct conception of a bed, a chair, a couch, a table. The evolution of each is as clearly traced as that of the chair, and in the beautiful volume by Kuhl and Köner, on "The Home Life of the Greeks and Romans," one may find the history of all they regarded as furniture.

The most perfect adaption to the use required of it, and the utmost beauty of line and finish, characterized even the simplest and humblest piece of furniture or bit of pottery; and to gain again the beauty of these two essential points, in our modern work, we must study the creations of the past and learn the thought of the beauty-loving Greek, and of the nation that followed in his train.

In its intimate relation to human life, furniture forms a direct expression of the class, "age, sex and condition of servitude" of the user. Each class, varying in its needs, varies commensurately in its furnishing; another evidence of its place as an extension of human power and activity. As the human creature varies and develops, his furniture varies and develops in absolute relation to himself.

Poverty, luxury, intelligence, all are shown in the furniture, the upward growth manifesting itself quickly in luxuriant outburst of new things; and the downward in the slow processes of unrepaired decay.

It is our misfortune—the misfortune of those of us who have approximately what furniture we want; that our evolution into "heterogeniety" is neither "definite" nor "coherent;" that we do not grasp the principles which relate the development of furniture to life; and therefore the orderly arrangement of our rooms, and the carefulness of our dusting, does not give truth or peace to discordant collections of upholstered articles, having neither intrinsic nor relative beauty.

At this point we find, as usual, that the higher specialization of man's work has given him more perfect furniture. A finely appointed office or study, with its desk breathing embodied business, its chair of complex possibilities and perfect comfort, and its revolving bookcase that seems so glad to serve the wish of its master; this shows a more advanced degree of furnishing than is possible in the home. To study such an office, or turn her attention with equal care to the kitchen of a buffet car or a steamship, the arrangement of a laboratory, a store, or any room devoted to special uses, would compel an intelligent woman to thought on the immense deviations found in the home, and whether such deviation is in the lines of progress or against it.

Why does a man prefer a leather-covered, stuffed easy-chair to a rattan rocker with a blue ribbon woven into its orificial decoration, and a tidy pinned to its back? It is not a matter of personal opinion merely, nor is it a question of sex, necessarily, for the woman of business does not admire the cobwebby rocking chair, above the smooth comfort of the other one. The leather chair rests the body, does not stick to the clothes, does not in any way obtrude upon the notice, does not fasten to the back when you get up, does not tip over when it is touched. The leather chair is a piece of true evolution, rightly modified by modern needs. It is not so nobly beautiful as the Greek or the Roman chair, but it is beautiful in its right service of existing man, and so, legitimately beautiful after all.

How came to pass that other thing with the tidy on it? What process in evolution has bestowed upon us the museum of tip-overables in these rooms of ours which should breathe only of rest and pleasure?

The process is something after this order. The life of the average woman is so spent in conflicting interests and industries that she cannot develop any true taste for large truths of relation. She is accustomed to unrelated activities and their unrelated utensils; used to going from stove to dish, from dish to duster, from duster to sewing machine, with one hand it may be, rocking the cradle all the time. It does not therefore distress her to see a ribbon on the parlor coal-hod, a gilded milking-stool painted with daisies, or a rolling-pin covered with velvet. Relation not being in her life, why should she feel the need of it in her furniture? She herself must answer a multitude of needs; why, then, should not the table carry whatever one may choose to put upon it?

Were women sensitive to the discord about them they would die sooner than they do, which is needless. Moreover, our women in their sheltered lives develop more of personality, whim, caprice, passing and changeful preference, just as children do, a thing that more general life modifies in man.

Save to the occasional artist, it is rarely that it occurs to a man to express his personality in his furniture. He does not "like it this way" and that way, and the other way; and change it about for variety's sake, as she does. He got it for a purpose, placed it for a purpose and used it for a purpose; "liking" it only as it serves his purpose. Therefore he does not tire of it, and it does not tire the beholder.

Is the home then, because of these facts, to be turned into a howling wilderness of leather and hardwood? Heaven forbid! Within the limits of easily learned artistic laws, this very personality and variability, the modification to multiple use and occupancy, the teeming suggestion of youth and age, and all sweet natural living—all these are precisely what gives household furniture its charm. Just as woman herself, comparatively unspecialized and so still promising all things; serving as the artist's model and the sculptors' type of great thoughts—standing for the figure of Liberty, Justice, Truth—because she is not too closely fitted for a special task, but expresses humanity in the abstract, so our household furniture which does not speak of work, but of rest: not of concentration, but of diffusion; not of where we are going to, but of where we come from—breathe calmness and beauty and peace.

Two things most needed in our conception of right house furnishing are these: 1. The elimination of all that speaks of toil. Home is peculiarly a place of rest; though the birthplace of all industries. All the special furniture that speaks of special task should be as far as possible banished or at least concealed. 2. A thing of vital importance of which we seldom think. While our home is from the beginning and essentially "the place of children" yet we do not, either in building or in furnishing, allow for their needs and pleasures. It is a peculiar oversight, and one which will be remedied when the household economist has voice in the choice and building of the home and its furniture.

On most of these points our minds are chiefly a blank, we who were brought up in homes where childhood was unplanned for, and who, going to the new nest, think more of Cupid and Hymen, and possibly of Mrs. Grundy, than we do of the family the home is meant to shelter, make no provision in our purchasing for the larger half of the occupants. At any one time there are more children than there are grown up people, and they are more important. They are "always with us."

Children as a permanent class have yet to be considered, but such they undoubtedly are. Should not then the furnishing of the child's home—*all the home the child ever has*—be planned with some consideration of his needs and pleasures? As it is, the most he can hope for is a "high chair" to bring him to the adult table, and possibly a little "rocker" to hug and fall down stairs with.

The children must "get up off that floor," of course, for though it is the child's natural resting-place, it is not arranged for his health and comfort. So they sit in people's laps for a while, or struggle about uneasily in big chairs and sofas, and disport themselves on stools and hassocks under protest; being hurried meantime with constant directions as to how to sit, and reiterated commands to "keep quiet," until they can go out of doors or go to bed; even when out, being usually cautioned not to sit on the ground, vainly, however—thank Heaven!

Shall the human home, then, be furnished like a kindergarten? No, but there should be, so to speak, a kindergarten in every home or near one. The child should have his furniture as well as we. And furthermore, knowing that our homes are the homes of children, we should not fill them with articles of constant temptation to the normal activities of childhood. A human home is not a museum; it is a place to live in peaceably, young and old—more especially the young.

Fortunately this need is being in a degree recognized, and furniture of good quality is being made for children's use, from the little enameled iron and brass bed, the most rational type of bedstead, to the small bureaux, tables, chairs and other fittings that belong with them.

The room in which much living is done—living with its innumerable modern demands—requires substantial as well as beautiful furniture. And no one has better given the essentials than William Morris, who, in an essay on "The Beauty of Life," in his "Lectures on Art," describes what he regards as essential to the ordinary sitting-room of a healthy person:

> "First, a book-case with a great many books in it; next, a table that will keep steady when you write or work at it; then several chairs that you can move, and a bench that you can sit or lie upon. Next, a cupboard with drawers; next, unless the cupboard be very beautiful with painting or carving, you will want pictures or engravings such as you can afford—only not stop gaps but real works of art on the wall; or else the wall itself must be ornamented with some beautiful or restful pattern. We shall want also a vase or two to put flowers in, which latter you must have sometimes, especially if you live in a town. Then, there will be the fireplace of course, which in our climate is bound to be the chief object in the room. That is all we shall want, especially if the floor be good; if it be not, as by the way, in a modern house it is pretty certain not to be, I admit that a small carpet which can be bundled out of the room in two minutes will be useful, and we must also take care that it is beautiful or it will annoy us terribly."

This last is a trifle extreme, but for the rest I think we may admit that both children and their elders would be far more at ease if every item were carried out literally.

I have been in houses where, from top to bottom, there was absolutely not one spot where one could really live, since beds were too fine to lie upon, chairs too frail to sit upon, tables too shaky and uncertain for comfortable writing or drawing, and all things over-ornamented, and generally calculated to spoil temper and shorten life. Can one imagine that the children with their sensitive organization are not tormented and hampered in the same way? For them, if for no other reason, we need to study the laws of furnishing and give them models that will form taste and make cheap vulgarity forever impossible.

The factor of nobility, not only in the evolution of furniture but also in our relation to it, is an important one to the student. Remembering the principle that the value of human production is in proportion to its durability and usability; to the number of people who can use a thing and the length of the time for which they can use it—we see that the value of a special article of furniture is greatly limited by personality. If one is peculiarly shaped, and one's chair is peculiarly shaped to fit, it is less valuable as a chair, and would sell for less at an auction. On the other hand, it would cost more to have it made, and it is of far more value to the owner because of this peculiarity.

Here is a sharp line to be drawn in reference to personality. If we do one kind of work and are accustomed to one kind of tool only, there grows up a certain intimate relationship between that tool and us which adds greatly to its usefulness. But if it be lost and we are forced to use a slightly different tool the change detracts from our usefulness. To have comfort or power depends on one's one special furniture is a limitation of use in the line of racial retrogression.

To be localized then, and stationary, to be fixed to one's own implements is a subhuman condition, and one to be guarded against. A free and easily adjusted relation to both furniture and tools is to be sought, else one is held down by material limitations. These are in outline the laws and principles of furnishing and furniture, and when they are better understood we shall find life a nobler, sweeter, easier process. The child surrounded by beauty and order will grow up smoother and rounder in character, less irritated, less rubbed away. The adult living among beautiful and orderly forms, all peacefully serving their uses, will find a clear atmosphere, either for work or rest, and the improved grade of humanity so fostered will manifest itself in kindred improvement in every other branch of sociologic progress.

Helen Campbell.

ELECTRIC LIGHTING OF MODERN OFFICE BUILDINGS.

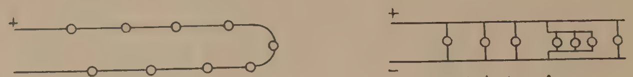
THE arrangement of electric lights in an office building, and of the wiring for them, is generally the last thing in connection with the design to receive attention from the architect, and it is frequently the case that no thought is given to the disposition of the wires until after the contract is let and the construction of the building well under way. The result of such a proceeding is that the wiring is only accomplished by a reckless cutting of plaster and tiling, and even of the flanges of iron beams, at no little expense.

The principles which govern the running of electric wires in office buildings are by no means difficult or complicated, but it is invariably advisable to give them due consideration, and to make proper allowance for this important branch of the building construction.

Of the two great systems of incandescent lighting, the "direct-current" and the "alternating," the latter is but rarely encountered in office-building practice. Its advantage is found in transmitting current for long distances, and even where it is used the "converter," which transforms from a high to a low electrical potential, is placed outside the building, and the low potential wiring inside practically conforms to the principles of direct-current wiring on the "two-wire" system. Incandescent lights are moreover invariably, for electrical reasons, wired in some form of what is known as "multiple-arc," as distinguished from "series" wiring, which is generally used for direct-current arc-lighting. In "multiple-arc" the lamp terminals are all connected together electrically into two wires, which connect direct to the dynamo terminals, instead of being connected one after another as in series. (Fig. 1.)

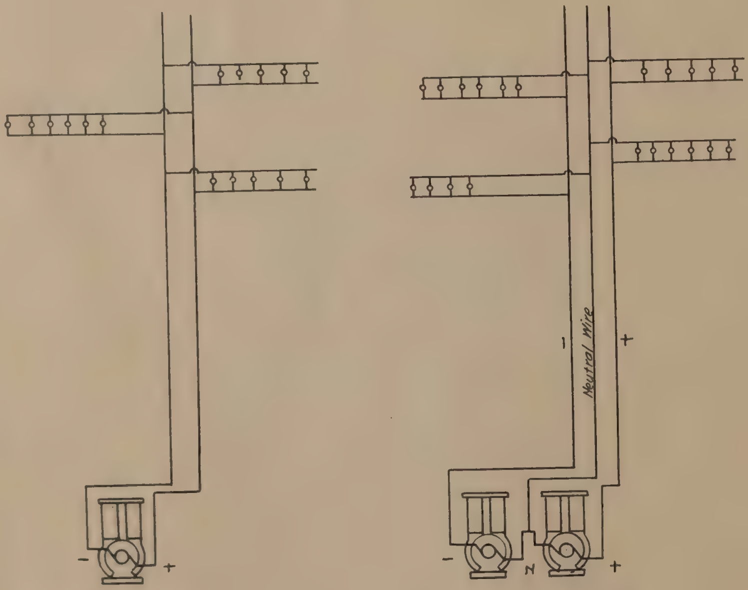
There is, however, an important modification of the ordinary "two-wire," multiple-arc which is frequently met with in office building practice, and is known as the Edison "three-wire" system. This was devised by the great inventor as a means of reducing the size of the mains required, where the current was to be carried any considerable distance. There is no particular economy in using the three-wire system in an office building which installs its own dynamos and plant, but in most of the large cities the Edison system is installed under public franchise to furnish light from central stations, so that in buildings which take electric light from the public mains the wiring has to be adapted to the three-wire system.

The general principle of the three-wire system as distinguished from the two-wire will be readily understood by reference to the diagram of Fig. 2, and also to Figs. 3 and 4. In it the dynamos are set in pairs, the positive terminal of one dynamo being connected to the negative terminal of the other. The positive and negative mains of the system are connected to the free terminals of the two dynamos and a "neutral" wire is run from the connection between. The lamps are all connected between the neutral wire and one of the outside wires, and should be divided as equally as possible between the two "sides" of the system. It will be readily understood that if they are divided absolutely equally, when all are burning, there will be no current flowing in the neutral wire at the dynamo, and the economy of this system arises from the fact that the neutral wire need only be of size sufficient to carry the current necessary to make up the difference in load between the two sides, while between the positive and negative mains the difference of electrical potential is twice that in the two-wire system, with the same difference at the lamps, enabling much smaller mains to



Series Multiple Arc

Fig. 1.



Two Wire System Three Wire System

Fig 2.

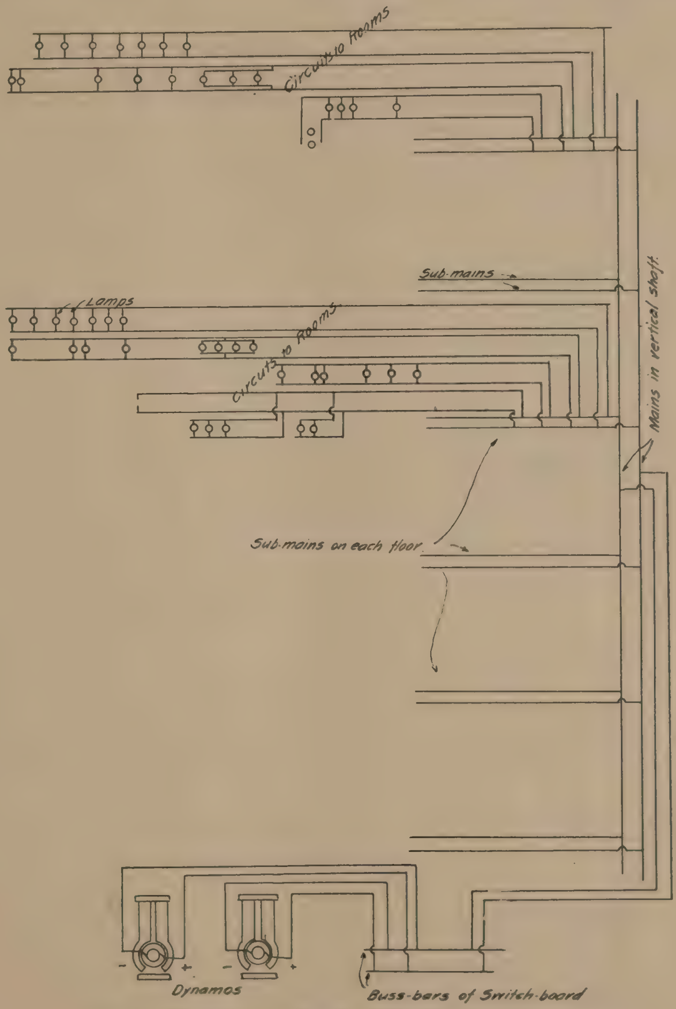


Fig. 3.- Diagram of wiring for Office Buildings (Two Wire System)

BOSTON PUBLIC LIBRARY.

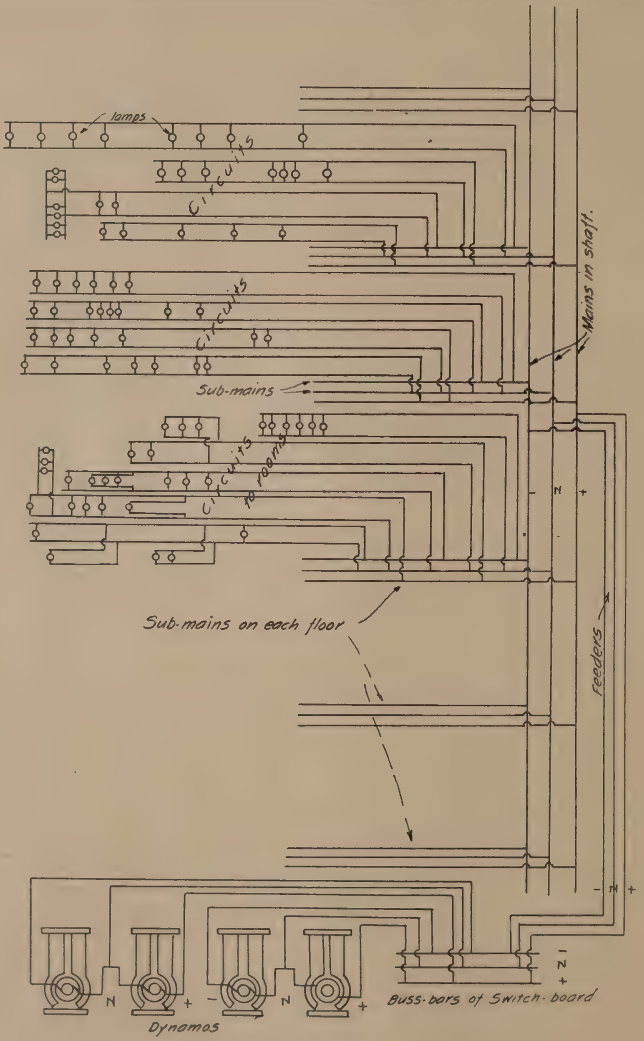


Fig.4.-Diagram of Wiring - (Three Wire System)

be used with the same percentage loss of potential.

In office buildings it is almost invariably found most convenient to run the "mains" vertically through the building, and "distribute" the connections to the lamps from these at each floor. The mains are run from the basement to the attic as straight as possible, and are generally located in a ventilating or pipe shaft. "Submains" are taken off at each floor, and are run to a "center of distribution," at which point all circuits are taken off for the individual lamps. No circuit should supply more than eight lamps, and each is invariably connected to the submains through a safety fuse "cut-out," which melts and breaks the connection should any accident occur to "short circuit" the lamps or wires. It is of course possible to run submains to more than one center of distribution on each floor, although if the floor area is large it is generally better to have two or more sets of mains running vertically, as it is generally the case that the arrangement of rooms and corridors brings the centers of distribution for the various floors directly above one another. The feeders which run from the mains to the dynamo switchboard are connected to them at about the middle of their electrical load, for, were they connected at the lower end, as might seem more natural, there would be a much greater loss of potential at the lamps on the upper floor than at those on the lower. For the same reason, in a very high building, much over ten stories, the mains are divided into two sections, and a separate set of feeders run from the switchboard to each section, as indicated in Fig. 5. This arrangement affects a still more uniform distribution of current.

These general principles of the wiring system will be more easily understood by reference to the diagrams of figures 3 and 4. The "sub-mains" should be provided with fusible cutouts, at the connection to the mains, and similar ones should be placed on each set of feeders at the switchboard.

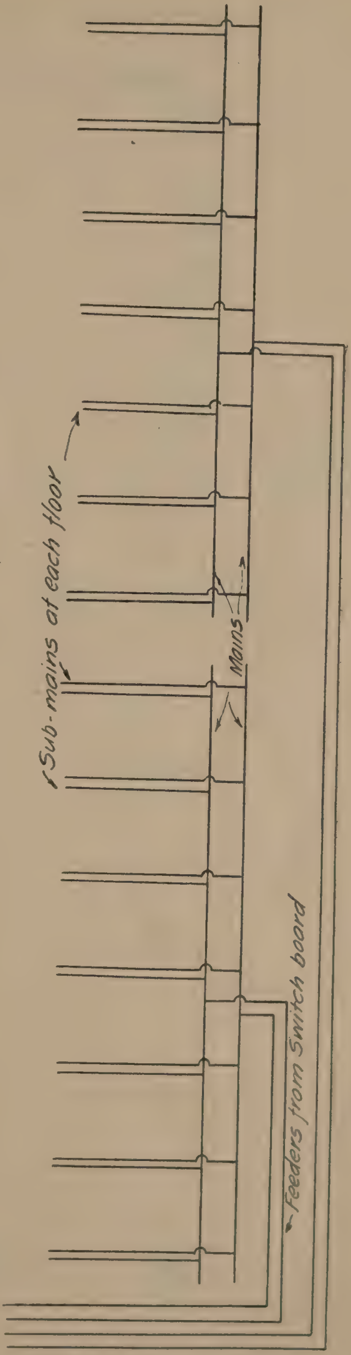


Fig. 5. Diagram of Main and Feeders in very high buildings (Two Wire System)

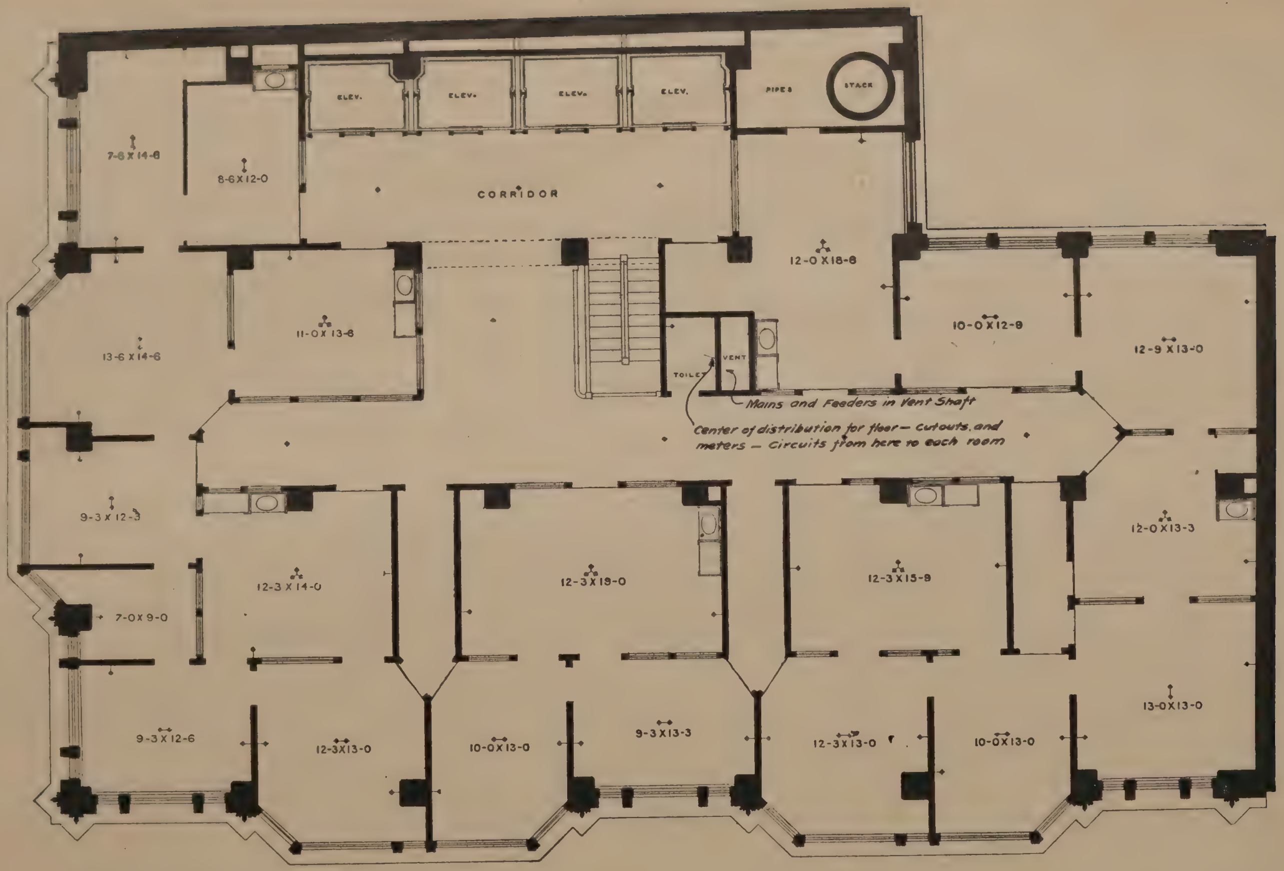


Fig. 6. Typical Floor Plan Reliance Bldg., Chicago.

BOSTON PUBLIC LIBRARY.

Where the current is taken from a commercial system the "buss-bars" of the switch board are of course connected direct to the street mains, and in such cases an independent system of mains and feeders is usually run up the building to supply only the lights in the corridors, toilet rooms and janitors' closets, so that these may be kept entirely independent from the lights used by the tenants.

It will now be seen that the shaft in which the vertical wires are run must contain from four to nine wires, depending upon the height of the building, and whether or not the three wire system is used; and these numbers might be doubled if a separate system be installed for the corridor lights. These wires are always large and heavy and should be run perfectly straight and supported on a firm wall by means of iron brackets and glass insulators, and should be set at least three inches apart so that joints may be readily made and inspected. They should, moreover, be kept free from contact with gas and water pipes, and should be easily accessible for inspection throughout their entire length. They are sometimes of necessity run in special small shafts built against a wall or column, and in such cases if they cannot be hung on brackets and insulators they should be run in conduits, and cabinets should be built around the joints where the sub-mains are taken off.

In regard to the wiring for the lamps on each floor, there is much that may be said. The "center of distribution" for the circuits should be located as near as possible to the center of the floor area to be covered so as to reduce the average length of circuits. It is of course desirable to have this point near the mains so that the sub-mains will be short and in most arrangements of rooms a "janitor's closet" is placed adjacent to the main pipe shaft so that unless the shaft is a long way from the center of floor area, the circuit cut-outs are best placed in such a closet, which also avoids locating them in a more conspicuous place. The cut-outs are best set on the wall in cabinets made preferably with slate or marble backs and sides, and with iron doors. If made of wood or even with wood doors, the wood work should be lined with heavy asbestos paper. If meters are used on the circuits it is much better to place them directly in the cut-out cabinets.

As before stated, not more than eight 16-candle-power lamps are placed on one circuit, otherwise with a varying number of lamps lit, there will be too great a variation in their brilliancy. Of course, if all the lamps are in a cluster and are turned on together by one switch only, any number can be put on one circuit. In practice, however, all the lights of each room are almost invariably put on separate circuits, so that each room is independent of the others, and where the rooms are small there are generally but four or six lights per room. If rooms are divided as shown at "A," in Fig. 7, those which have no direct corridor connection and open only into one room, may safely be put on the same circuit with the corridor room. After the offices in the building are rented it is always found advantageous to have the wiring of each room distinct, and if light is furnished through meters, it is absolutely necessary, as it is never possible to know

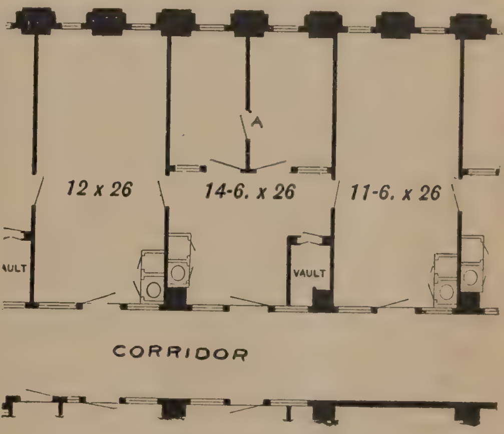


Fig. 7.

exactly in what arrangements the rooms will ultimately be rented.

In the matter of meters, it is, in the opinion of the writer, always desirable to put them in on every room. This is almost invariably done where current is supplied from a public station, but even where the building installs its own dynamo plant, there is much less dissatisfaction among the tenants when they pay for the amount of light actually used, rather than a flat rate per light per month.

In regard to the various methods of running the circuit wires, there is opportunity for much discussion, and although the conditions in a large number of buildings might seem very similar, yet no set of rules can be laid down which would cover the detail of more than one building. The primary essential in any wiring system is perfection of insulation, but just what is necessary to perfect insulation under a given set of conditions is invariably open to dispute. In the earlier days of office building wiring, it was considered quite sufficient to cleat the rubber insulated wire on the tiling of walls or ceiling and imbed it rigidly in the plaster, and the wiring in many buildings done in this way several years ago is to-day giving practically perfect satisfaction. In recent years, in order to protect the wires more absolutely, a number of varieties of "electric conduits" have been put upon the market, and are urged as essential to a good system of wiring. These conduits are tubes made of vulcanized paper or hose, and sometimes covered with a thin sheathing of brass, or even iron pipe is used. The idea of a conduit was primarily to form a raceway from which a wire could be withdrawn and renewed without injury to walls or plastering. It is, however, difficult to put up conduits so that this can be accomplished, but to that end, when they are used it should be insisted that they be put up complete with long radius bends and joints as few as possible, and carefully made, and that the wires be drawn in after the completion of the work. Conduits are now advocated as essential by many engineers, and although the ordinary insulation on a good rubber covered and braided wire is sufficient when new, it is considered to be liable to deterioration when imbedded in plaster or in the cinder covering of a tile floor, and the conduit might therefore serve as a valuable protection against this danger as well as against the danger of mechanical injury during the construction of the building, and during alterations and repairs afterward. If mechanical protection is especially desired, nothing is better than an iron pipe, but unless it is itself lined with a vulcanized insulation the iron is not an insulator, and it is claimed by some that the action of the iron and iron rust will, in a comparatively short time, deteriorate the insulation, and a nail can be driven through a brass covered paper conduit almost as easily as through the ordinary paper ones. The electric conduit is unquestionably desirable in certain places, and under certain conditions, but the advantages of the different conduits should be carefully weighed by an expert to meet the conditions of each separate building. The only real test of a conduit, or of an insulated wire for that matter, is the test of time under practical conditions, and few, if any, of the conduits have been in use long enough to have thoroughly met that test.

There is, moreover, another important consideration in this connection. It is a matter of practical experience that in any office building or store building a large percentage of the lights are never put in as originally laid out, and after the building is occupied changes are continually being made in the arrangement of partitions and furniture to suit tenants, which invariably involves changes in location of lights and wiring. The conduit may permit the renewal of a wire, but it will not permit a change in the location of lights without greater disturbance of walls and plastering than would probably be necessary were no conduit used. It may be put down that on an average the location of all lights of an office building and the wiring corresponding are changed at least once in six or eight years, and in many cases much oftener, and within the rooms a circuit can often be successfully run principally in a moulding. But this is only within the rooms. The corridor partitions are generally more staple, and the wires running down the corridors between the centres of distribution and the rooms are consequently more permanent. A very large number of wires radiate down the corridors in all directions from the cutouts, and adequate provision should be made for them. They are generally run on the ceiling, though frequently on the floor. If they are put on the floor there is much more danger of mechanical injury during construction, and there are generally various pipes crossing the floors which have to be passed. In any case these wires should be well protected, as well from each other as from external injury, and it is therefore desirable to run them in conduits or in channels built into the walls, though even if this is done the wires must be carefully secured and protected, and kept well separated. In any case whatever, the circuits should be carefully laid out so that the wires will not cross one another.

In the matter of distribution of lights in an office building there is but little to be said. Where the floor area is divided up into small offices, the lights should be placed with due reference to the probable location of desks and other office furniture. In small rooms, except those occupied by doctors and similar professions, ceiling outlets are not as useful as wall brackets. In rooms of considerable floor space which are used for stores or salesrooms, the most ideal light is one which is diffused from small clusters of two or three lights each, distributed uniformly on the ceiling. If this is carried to an extreme, however, where the ceilings are low, it will give one the feeling of not being able to get away from the glare of light. This is often experienced in basement restaurants. Also, where a large space is broken up by columns, the effect which their shadows will produce must be considered, and a very good illumination is often obtained by rings of lights arranged about the columns and carefully worked into the ornamentation.

In a large open space with not very high ceilings, one sixteen-candle-power lamp to seventy square feet of floor space is fairly good lighting, but they are often put in one to thirty or thirty-five square feet, while fifty to sixty feet per light may be considered an average. For small offices, the necessity of having two or three lights to every room generally makes the average lighting about one to forty or forty-five square feet of floor.

Each building, however, involves special features, both in construction of wiring and distribution of lights, and only a careful study of the existing conditions and necessities in each case can attain a system of lighting which will be thoroughly satisfactory both to the owner and tenants.

Wm. S. Monroe, M.E.

THE SMALLER HOUSES OF THE ENGLISH SUBURBS AND PROVINCES.

PART II.—CONSTRUCTION.

SECTION I.—FOUNDATIONS.

IT is apparent to everyone that the foundation of a building is one of the most important parts of its construction, and it behooves us to go somewhat carefully into this subject. In dealing with the subject I propose dividing it into two heads, viz.:

ORDINARY AND ARTIFICIAL.

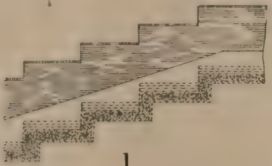
As artificial foundations come more within the province of the engineer I do not propose to describe them here.

ORDINARY FOUNDATIONS

may be divided into two classes: In the first class, those of rock, clay, gravel, chalk and sand; in the second class, those on soft ground and ground of varying qualities, defective in parts, but not such as to require piling or timber rafts.

ROCK.

Solid rock, when uniform in character and with an upper bed either horizontal or perpendicular to the pressure upon it and of a thickness sufficient to bear the weight safely, is a foundation of the first class. If, however, the rock is (like some clay slates) liable to disintegrate when exposed to the weather, it should be covered with a bed of concrete. In the case of foundations in rock *on a slope* it is advisable, to save cost of excavation, to step the footings, that is to carry only a small portion of the footings level, say 8 or 10 feet, and to have the next length of 8 or 10 feet at a higher level, keeping the higher portion of each length the same distance below ground as in Fig. 1. In rising or stepping the footings care must be taken that the projecting footings of the lower portion are taken sufficiently under the upper to prevent a straight joint and to transmit the weight.



1

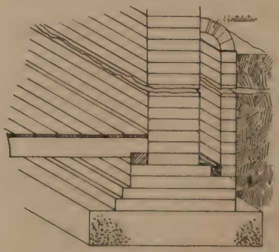
CLAY

in various degrees of consistency is found in most places, and when sound and tolerably dry and protected from the action of the atmosphere (which latter must be done) by making the foundations deep and covering the bottom of the trenches with concrete is a good soil to build on.

One element of danger with clay is the continual change caused by atmospheric influences, which are very liable in hot weather to cause cracks and to form deep fissures by which water is led below the surface. This causes the footings to become defective unless they are placed deep enough to be out of the reach of such channels or fissures and are well drained.

GRAVEL

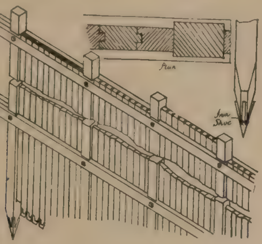
when sound, makes the best possible foundation, for, being pervious to water, the surface drainage is enabled to run away and so to leave the footings free from moisture, while in a clay foundation the water is penned



2

in on the site and where there is a basement or cellar it becomes necessary to either line the walls with asphalt on the outside or to build "dry-areas" round the basement walls (Fig. 2).

If the gravel should be found loose and coarse it is then requisite to form a bed of concrete on which to rest the foundations. If found very unsound, it is then necessary to prevent the soil from shifting by treating it with sheet piling (Fig. 3).



3

CHALK

like clay varies immensely in its value as a good foundation, but with care and proper treatment can be made reliable. It is found at times as hard as a rock, while it is also found as soft as paste. Chalk at all times, whether found in a hard or soft state, should be drained, and in cases where springs are found to exist they should be most carefully diverted but not dammed out, as if so treated they are apt in rain or wet weather to burst through and so damage the foundation.

SAND

forms a good foundation when prevented from escaping laterally by sheet piling or other means. Care should be taken to exclude water more particularly from a sand foundation as it is likely to wash away the sand and so cause a settlement.

Having now described the qualities of the several strata referred to in Class I., their treatment for foundations and the several defects to which they are liable, attention must be called to a few rules in daily use which are applicable to all foundations.

TRIAL PITS.

Before commencing work these should be dug or borings made at different points on the site in order (1) to ascertain the nature of the ground, (2) the thickness or inclination of the strata, (3) to find out if water exists and at what level, and (4) if there are any springs. If the latter are found, their sources should be ascertained and arrangements made to divert the current of water.

Having decided the depth and character of the proposed footings, the bottoms of the trenches should then be carefully examined and sounded to ascertain any local defects and then leveled throughout in one plane, if convenient, or in successive levels of the several lengths where stepped.

DRAINAGE.

The ground should be well drained before digging to increase the firmness of the soil. All bad portions should be cut out and made good with concrete and loose portions rammed solid or removed. Care should be taken that, where filling up deep holes, the concrete is allowed to settle before the ordinary foundation is added thereon, so that there may be no unequal settlement throughout the varying depths of concrete.

FROST.

All foundations (especially those on clay) should be of such a depth as to be free from all effects of frost. In England this should be not less than 3 feet for ordinary soil and 4 feet for clay.

PERMANENT DRAINAGE

is necessary to keep foundations dry so as to prevent dampness, damage by frost, or subsidence through the action of water.

Now let us turn our attention to foundations in those classes of soil which we have placed in the second class, viz.:

COMPRESSIBLE SOILS.

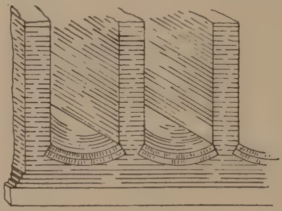
Foundations in these soils require great care, more especially when the buildings to be erected are of varying heights. It is advisable in this case to spread the weight carefully and equally over as wide an area as possible, carefully ramming the bottom of the trenches as solid as possible and levelling before the building is commenced and thoroughly tying in the whole structure throughout so as to guard against unequal settlement.

SOFT TOP SOIL.

When the surface of a site to be built on is composed of a soft soil overlying a firm one, if upon testing the depth it is found not to be too expensive, it will be best to take the whole down to the solid; or else a number of holes may be sunk and piers built up from the solid, on which arches should be turned to support the walls above. This is open to objection as it is throwing all the weight on to certain small areas, which is quite at variance with the purpose we look for, namely that a foundation should transmit the several weights which it has to carry over the whole area of ground by means of footings so as to reduce the pressure by giving them as extended an area as possible. Consequently such piers must have an ample area of base in order to overcome this objection.

In the case of a *stratum of good ground overlying a soft one*, if after examination the stratum is found to be strong enough to bear the weight proposed to be put upon it (which would best be found by testing on either side of the proposed footings), then spread the weight as evenly as possible thereon, taking care that the soft substratum has no chance of escaping, by piling, if necessary,at the side. Should the soft substratum have an outlet on the side of a hill or river it will probably ooze out and cause a settlement, moreover if the soft stratum should be peat it will be advisable to drain it before commencing operations.

Next, as to a foundation of uneven quality, part firm and part soft, it is evident that such a foundation cannot be built over without some special treatment or there would be unequal shrinkage, and defects of all kinds would show. In such a case one must be guided by the nature of the building to be erected, by the distance apart of the firm portion of the foundations and the depth of the unsound. It may be best to build piers upon the solid margins of the unsound portions, with connecting arch over on which the building is erected, the base of the piers being connected with arches called "invert," which transmit the weight equally towards the bases of both piers (Fig. 4). In forming such invert arches it is necessary that they should have an efficient abutment on both sides so as not to overbalance the resistance of the end piers.



4

Arches have been used at times on a foundation of clay to keep out water from a cellar, in which case they should be laid after the building is up and of sufficient weight to counterbalance the thrust of water, otherwise the pressure is apt to throw the side walls out. Such an instance came under our notice on the South coast a few years ago.

Having pointed out the various soils to be dealt with, we need only note in conclusion that the following are the qualities that a good foundation should possess:

(1) It must be perpendicular to the pressure put upon it.

(2) It must be solid, or if yielding, it must be equally so over the whole site.

(3) It must be unaffected by atmosphere or other influence.

(4) It should be of sufficient area to bear the pressure put upon it.

We may also call the attention of the reader to the definition of a proper foundation under the Metropolitan Building Act, wherein it states that:

"No house, building or other erection shall be erected upon any site or portion of a site which shall have been filled up or covered with any material impregnated or mixed with any faecal, animal, or vegetable matter, or which shall have been filled up or covered with dust or slop or other refuse or in or upon which any such matter or refuse shall have been deposited unless and until such matter or refuse shall have been properly removed by excavation or otherwise from such site. Any holes caused by such excavation must, if not used for a basement or cellar be filled in with hard brick and dry rubbish."

The same act requires that "the site of every house or building shall be covered with a layer of good concrete at least 6 inches thick and smoothed on the upper surface, unless the site thereof be gravel, sand or virgin soil."

Now, having dealt with the removal of surface soil, the act goes on to that quality of a foundation with which we have yet to deal, viz., the area required for the pressure, and states thus: "The foundation of the walls of every house or building shall be formed of a bed of good concrete, not less than 9 inches thick and projecting at least 4 inches on each side of the lowest course of footings of such walls. If the site be on a natural bed of gravel, concrete will not be required." Thus again stating that gravel in its natural state is the cheapest and best foundation.

Although 4 inches is mentioned above as sufficient for the bed of concrete to project beyond the footings, yet in practice it is always provided that the least width of concrete beyond the lowest course of footings shall be 6 inches. In the constructions of these footings a sparing use of mortar in spots loaded with the greatest pressure is advisable.

We need not here go into the question of weight that may be put onto foundations which would never be overloaded in the case of an ordinary house.

This brings us to a close of this subject, one of the most important in the matter of building and one in which too much care cannot be taken.

SECTION II.—WALLS.

BRICKWORK.

On the rebuilding of London, after the great fire of 1666, brick was the material universally adopted, and an act then passed for the erection of the new buildings described the thickness of the walls according to the number of bricks. In the brickwork of the buildings erected in London at the end of the 17th century (during the reign of William and Mary), and the beginning of the 18th (during the reign of Queen Anne), the brickwork was in many cases enriched by ornaments carved with the chisel, a method of ornamentation, which with the revival of Queen Anne work has been of late years much in vogue. (There is no doubt that we owe a great deal of the brickwork of the 17th century to William of Orange, who brought it over from Holland, where it was extensively employed, as mentioned above.)

It is not our intention here to go into the question of the manufacture of bricks, but to point out a few of the characteristics of good bricks and then to mention a few of the kinds in common use and to follow this with some remarks of a general character.

ADVANTAGES.

A good brick can easily be told,as,in addition to being (1) free from cracks and flaws and (2) from lumps of lime which are liable to be slaked by damp and thus expand and "blow," it should give (3) a good, clear metallic ring when struck with another or with the trowel; the surface of its sides and face should be (4) level and not hollow and (5) not too smooth or the mortar will not adhere thereto. Insufficiently burnt bricks absorb a large proportion of water and so are liable to decay. It is very generally stated that a good ordinary building brick should not absorb more than one-sixth of its weight, of course vitrified bricks (such as what are known as blue bricks) would not absorb more than one-fifteenth of its weight.

Great care should be taken that underburnt bricks (which are generally called *grizzle* or *place* bricks) are not allowed to be used, even for the interior of walls.

Bricks in the neighborhood of London average 8¾ inches in length by 4¼ inches in width and 2½ inches in thickness and weigh about 7 lbs. each.

The actual dimensions have varied somewhat, as in general they were made longer and thinner than the present day; in fact, more after the Roman type of brick. This long, flat brick has many advantages in appearance and can be obtained nowadays by special order.

It is a matter of taste, but, speaking personally, I am inclined to think the light red varieties are more pleasing than the dull red kind, especially in the neighborhood of London where everything tends to get grimy after a short time.

The color in red bricks is produced by the presence of iron, which in varying quantities produces the different light and dark tints.

YELLOW BRICKS.

These are what are known as the ordinary London stocks which are made around London and district. Some kinds have been used for facings, especially what are known as picked stocks with washed stocks for arches, but they are principally used for backing to walls and internal work to be plastered on. They are a rough kind of brick, but being composed of clay, burnt with coke-breeze, they are sound and useful for the purposes indicated above. There are several varieties, such as cutters, facings, paviors and hard stocks, each being used for its special purpose.

WHITE BRICKS.

Those known as Suffolk are among the best and are suited for face work in the districts for which they are found. Used in London, they are somewhat objectionable, as they get grimy and have little warmth of color and do not give the homelike appearance which is so necessary to the houses which we are discussing.

THE TIPTON BLUE BRICK

is used as a facing material with red bricks, in which it is occasionally placed to form patterns as in the 16th century, but it does not harmonize so well as in these old examples, the difference being that they were burnt with wood fires instead of coal.

GLAZED BRICK.

These are especially treated with a thin coating of white or colored enamel. They would not of course be used, in a general way, externally, but for areas and courts they are especially applicable as they can be kept bright and clean by being occasionally washed down, besides which they reflect light; for this reason a cream color is better than a pure white, which will be found too glaring.

Salted bricks or salt-glazed bricks have a thin glaze over their surfaces which is produced by throwing salt in the fire while the burning process is in progress. These are also useful in the same way as glazed bricks and they have been used as a facing to buildings in London, being of a pleasing brown color.

ORNAMENTAL BRICKS AND MOULDED BRICKS.

The manufacture of these have much improved of late years, which taken conjointly with the so-called Queen Anne movement has led to the use of moulded and ornamental bricks to a large degree in our smaller houses. Moulded bricks, that is those turned out of a mould, are better than those which are rubbed after burning, as the surface of the latter kind is liable to disintegration.

Rubbers, namely the class of bricks which are used for gauged arches and for carving, have considerably more sand to facilitate their cutting and shaping, and are consequently more porous.

The moulding and facing red bricks made by the Rowlands Castle Co., Hants, hold, deservedly, a high place, and have been used as a facing for the Hotel Metropole, Brighton, by A. Waterhouse, R. A., and numerous other important buildings; they are of a rich red color.

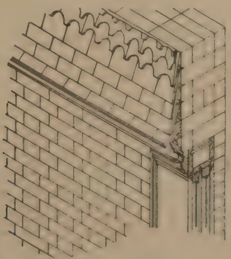
Moulded bricks of every conceivable section are made by the abovementioned and other firms, and are used to make up cornices, plinths, string-courses, diaper panels, etc.

It is a matter of taste whether colored mortars are admissible, but personally I do not think they ever look so well as a good white mortar joint. Blue and black mortars are, however, occasionally used, especially with red brickwork. Struck weathered joints are better than "tuck" pointing, which is never allowed by any architect worthy of the name.

WEATHER TILING TO WALLS.

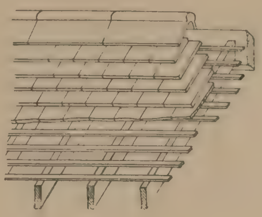
A few words as to the methods of employing weather tiling.

The great point to be considered is the method of fixing the tiles to the wall. This *can* be done by nailing battens to the walls at a distance apart, but this is not a good plan and, in my opinion, should not be adopted. It leaves an air space which is liable to be overrun with vermin of all sorts, and, besides this, the battens are liable to rot with age, and there is the expense of fixing them.


5

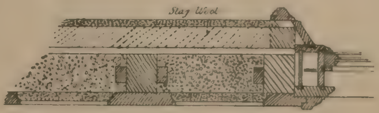
The best method is to build the walls with bricks on edge, then the nails which hold the tiles to the walls can be driven into the joints of the brickwork without the need of any battens at all. This wall may be 9 inches thick or 12 inches if desired (the bricks being on edge), and the wall will therefore be four bricks thick in a stretching course of a 12-inch wall (Fig. 5).

Ornamental tiles may be used either in bands, or for the whole wall; and we are inclined to think that when the roof is plain-tiled (Fig. 6) it makes an agreeable variation to have some part of the surface of ornamental tiling, as it is called, that is to say hung with tiles having a cut or circular end; but this, of course, is a matter of taste. Anyway, if you have bands of ornamental tiling, have them in broad masses, and do not fritter the surface away in small strips.


6

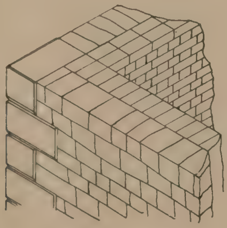
HALF-TIMBER.

The popular demand for picturesque buildings has led architects to revive the ancient and almost obsolete style of timber-framed houses, filled in with plastered panels, and, in spite of the many discomforts of this construction in our climate, numerous examples are constantly being erected (as in Fig. 7). Many, however, of these are only scene painting, so to speak, the owner being protected from the consequences of his fad by a hidden brick wall. On this are fixed deal boards, duly stained and provided with the indispensable, but now purposeless, wood pins, correctly projecting. Some architects endeavor to make their constructions more de-



7

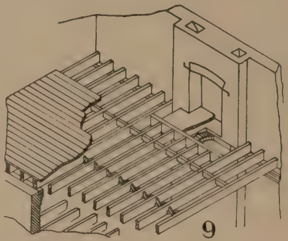
fensible by attaching these boards to the studs of the usual type of internal partition framing, employing some means, such as packings of slag wool, fillings of concrete, plaster, etc., to rectify its serious defects as an external protection. In no case, however, is the old construction adhered to, which is not surprising when we remember that in old examples beams 12 inches wide are set apart only their own width, the quantity of timber, often oak, in such houses being hardly credible. The gable ends of roofs seem to be the most legitimate places to employ such half-timber work, as damp and cold are not so much to be feared, and some scope is afforded for the picturesque fashion which seems to require a country house to be, or appear to be, built of as many different materials and methods as possible. The overhanging stories of the old houses are of great value and could be easily and safely done nowadays with iron and concrete floors and walls, but we should not like to see such constructions cased in the timber forms of departed epochs.



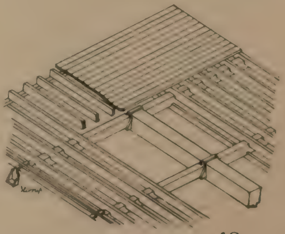
8

STONE.

We do not propose to occupy the space that this material requires for its full treatment, because with us the small house is not wholly of stone unless it happens to be in one of the stone-producing districts. Generally the stone-work consists only of freestone dressings to brickwork, or of special features, such as a stone doorway, or a bow window in a construction or design of other materials. For such features a fine colored yellow stone, called Ham Hill, is often employed. The stone is liable to have holes full of clay in it, and is very troublesome to work on this account. It carves in a coarse way, lending itself well to the reproduction of the vagaries of the Flemish or German Renaissance, and when well employed, as with well-colored red bricks, has a very quaint and charming effect. Bath stone and Portland are the other two main freestones employed in dressing. The former is cheap, but has a life of only about twenty-five years in London, while Portland, though hard and durable, weathers black and white in a special fashion, the color effect of which lends itself to a somewhat severer type of work than the class of home we are discussing. For this latter work a loose, irregular stone, often to be found upon a country site, is employed for rubble walling, requiring either brick or freestone quoins and dressings, and of course a brick internal lining, the walls not being less than 20 inches thick (Fig. 8). This rubble work is left rough, though usually more or less regularly coursed, and is extremely suitable, more especially for the first story, the upper part being often weather-tiled and the chimneys built in brick. In certain southern districts, flints found in the chalk are admirably adapted for building, either used as concrete with brick bands, quoins and dressings, the flints being somewhat arranged on the



9

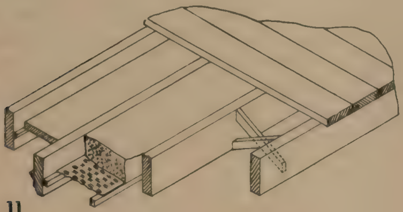


10

face, or, better still, squared and set like an ashlar walling in miniature, which latter method combines well also with freestone dressings instead of brick. When flints are used unsquared, the brick bands are highly necessary for the construction. They must be carefully studied for effect, everything depending upon their intervals, the number of courses, the jointing and the thickness of the bricks.

SECTION III.—FLOORS.—ORDINARY.

The simplest form consists of joists (for sizes see below) placed side by side, on the upper side of which the floor boarding is nailed Fig. 9). To the under side are nailed the laths to which the plastering is secured. Double floors are sometimes used in which "binders" are introduced and separate joists are used to support the ceilings, which is a much better construction, as it prevents the sound passing above and below (Fig. 10).



11

These different kinds of more or less complicated timber constructions are rapidly going out of date, since the introduction of iron and its general adaptation in the construction of buildings. Single flooring is therefore mostly used and when it has to be strengthened an iron girder is made use of.

For houses where a fireproof construction is not desired the ordinary floor is still used, and when properly plugged with slag wool on expanded metal lathing between the joists it makes a fairly sound-proof floor, but it is always open to the objection that these spaces harbor dirt (Fig. 11).

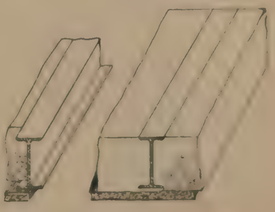
We may here add the table of scantling of timber joists for floors, as issued by the Ecclesiastical Commissioners, which may be taken as a reliable example of everyday practice.

Length of bearing in feet.	Breadth 2¼ inches, depth in inches.	Length of bearing in feet.	Breadth 2¼ inches, depth in inches.	Length of bearing in feet.	Breadth 2¼ inches, depth in inches.
5	5	10	8	15	10½
6	5½	11	8½	16	11
7	6½	12	9	17	12
8	7	13	9½	18	12x3
9	7½	14	10		

When the bearing exceeds 8 feet the joists should be strutted by one row, and when it exceeds 12 feet by two rows of struts. These may be either slips placed herring-bone wise or pieces of boarding nailed between the joists from one end of the room to the other to keep the joists firm in position (Fig. 11). In the class of houses we are considering such wooden floors are the usual practice, though attempts are being made to bring iron and concrete and other forms of fire-resisting floors into greater use by endeavoring to bring down their cost to that of their rivals, and in the process the rigidity of these floors is in danger of being sacrificed by undue economies in the scantling of the ironwork.

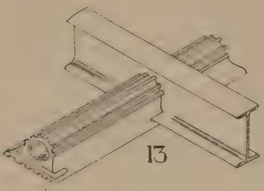
IRON GIRDERS AND COKE-BREEZE FLOORS.

A method now being adopted in large flats, and which is considered very little if any more expensive than ordinary wooden flooring, is as follows: Rolled iron joists, 6x3 (varying according to span), are placed 3 feet apart centre to centre, between which and flush with the upper face of the joists is placed the concrete 6 or 6½ inches thick. The underside of this, which is left purposely rough, is plastered in the usual way, but without, of course, the intervention of laths (Fig. 12).



12

The concrete is composed of 4 or 5 parts coke breeze to 1 of Portland cement, and the flooring is of selected wood blocks 1½ inches thick, laid direct onto concrete; in other cases ordinary flooring boards are nailed direct onto the coke breeze concrete, which takes nails well, care being taken that the concrete is perfectly dry.

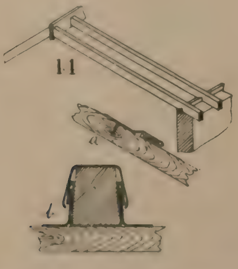


This is a sanitary construction, abolishing the objectionable hollow spaces of the ordinary wooden floors which are liable to become receptacles for dirt and vermin and favor the spread of fire.

MARK FAWCETT'S FLOORING

lately introduced with great success, and said to possess the following advantages: The fire-resisting material, a tubular lintol, is not the load-carrying material, but is a permanent centring protecting both the iron and concrete. There is a continuous cold air current always passing between the fire-resisting material and the load-carrying material. The cold air current is utilized for supplying fresh air without draught to Tobin tubes or internal walls, stoves, etc.

In buildings of the warehouse class, the tubular lintols or permanent centring save the cost of plastering, the appearance of the ceiling being sufficiently pleasing.



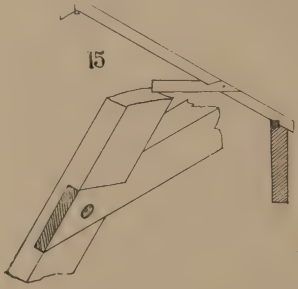
Floors are constructed on this system with great facility and dispatch, and are said to be more soundproof, lighter, and as strong as solid concrete.

Fig. 13 represents a fire-resisting floor, somewhat similar to Fawcett's, the difference being Fawcett's tubes are laid diagonally on plan.

SECTION IV.—ROOFS AND ROOFING MATERIALS.

It is not our intention here to go into the question of the construction of various forms of roof, because in the houses we are treating of they of necessity are of a simple character.

The simplest form, namely, what is known as the "couple roof (Fig. 14), consists of two rafters resting on their lower ends on a wall plate, and abutting at their upper ends onto a ridge-piece, to both of which they are spiked. If a horizontal beam, called a "collar," is fixed to each pair of rafters, to counteract the tendency of the rafters to push out the wall, the roof is then called a collar-beam roof (Fig. 15).

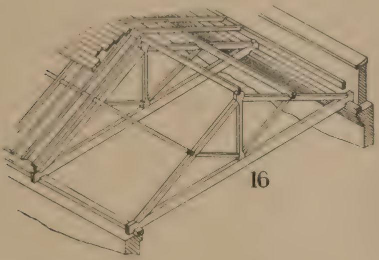


This form of roof may be used up to 15-feet span. But, in general, it is hardly safe to use it for roofs of more than 15 feet span, unless, as is generally the case, the partition walls go up, on which can be laid what are called "purlins," which are placed from wall to wall horizontally so as to support the under side of the rafters and prevent any tendency to push out the walls.

Above 20 feet span it is desirable, unless use can be made of the partition walls, to adopt a "truss," and such a one, called a ’"king-post" truss, Fig. 16, and consisting of a tie-beam, principal rafters, king-post, struts and purlins, may be used from 20 to 30 feet span; above which the queen-post truss must be used (Fig. 17).

When an open timber roof is adopted, as in large halls or billiard rooms, the roof is often, as it were, brought more into the room by means of a strong collar-beam of a curved form, or in other cases a hammer-beam roof may be adopted (Fig. 18).

We give below a table, which may be useful, of the least inclinations which are necessary for the different roofing materials which we are about to discuss. It must be understood that for the purposes of getting rooms in the roof, or for appearance sake, these may be varied, but it should be understood that no less pitch should be given.


16

ANGLE OF INCLINATION.

Kind of covering.	Inclination to the horizon, degrees.	Height of roof in parts of span.
Copper	3.50	1-30th
Lead	3.50	1-30th
Zinc	4.0	1-29th
Slates (large)	22.0	1-5th
Slates (ordinary)	26.33	1-4th
Asphalted felt	3.50	1-30th
Thin slabs of stone or flags	29.41	2-7ths
Pantiles	24.0	2-9ths
Thatches of straw, etc.	45.0	1-2
Plain tiles	45.0	1-2

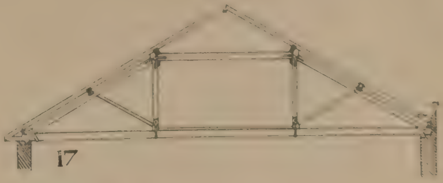
The materials used for middle-class houses, and which are most appropriate, are tiles, slates, stone slates, and occasionally lead and copper, for small roofs over turrets and the like.

TILES.

These are of various manufacture.

Pantiles are only used for outhouses which do not require to be made absolutely watertight, and are not used in the best class of work.

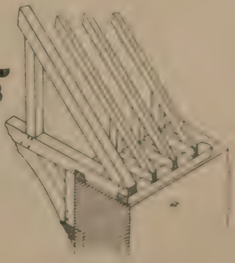
Plain tiles are rectangular in shape or may be moulded to various patterns. They are generally about 10$\frac{1}{2}$x 6$\frac{1}{2}$x$\frac{1}{2}$ inches thick. They are now usually formed with nibs on their upper end, which rest on the tile batten and every third course only is nailed. Either copper nails, 2$\frac{3}{4}$ inches long, should be used, or galvanized iron nails. The tiles should be laid so that the gauge is not less than 4 inches, to insure sound work.


17

Broseley tiles have acquired a reputation for being hard and impervious to moisture, and are made by several firms in the Broseley district in which the seam of clay is found from which they are manufactured. They are made in various colors, such as red, strawberry, brown, brindled and blue.

Broomhall tiles are also much used, and the makers say that they do not require heavier timbers than those for slates, and this is pointed out as an advantage. It is also pointed out as an advantage over slates that they are 14 degrees cooler than a slate roof in hot weather, and make a warmer covering in winter. Also snow is not so likely to slide off these tiles, and the cost is about equal to ordinary slating.

Very good tiles are also to be had from other districts, as in Berkshire and Kent.


18

Advantages.—Tiles are warmer in winter and cooler in summer, and this is a great consideration in a house and one which ought to weigh well with an architect in designing a house.

In general appearance they are much to be preferred to slates, and give, it seems to us, a warm and comfortable appearance to a house, which is much to be desired.

The weathering properties of tiles are one of their greatest charms, and add to the picturesque appearance of a house. Who of us has not admired those lichen-covered tiled roofs which cover the old-fashioned cottages studded all over England?

Disadvantages. — These are, we should be inclined to say, none, but our practical readers might object. In a general way they are heavier and require stronger roof timbers, and of course they absorb moisture more than slates, and are therefore more liable to communicate it to the rafters, but these tendencies can be overcome by going to a good maker and insuring that the tiles are thoroughly burned.

SLATE.

Slate is a species of argillaceous stone which, in consequence of the intense lateral pressure to which it was once subject, splits easily and in very thin sheets along its plane of cleavage.

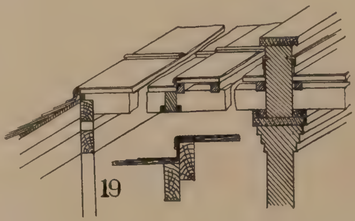
Slates are, of course, used largely and are of various sizes. A good slate should give a sharp metallic ring when struck, should not absorb water to any appreciable extent. There are several varieties which are found in various parts of England and Wales. Wales especially is renowned for its slate quarries, Bangor and Penrhyn being especially famous.

Irish slates are, as a rule, somewhat thicker and of a coarser grain. Those from Kilkenny and Killaloe are amongst the best known; these are also thicker and coarser, and are exceedingly hard and tough. Slates are also found in the north and south of England, in Westmoreland and Cornwall. Those from Ambleside and Langdale, in Westmoreland, are of a beautiful green color, and are infinitely preferable to any other form of slate for the modern dwelling house.

Stone slates, or tile-stones as they are sometimes called, are very much thicker than ordinary slates and may be rather described as sandstones than slate. They were formerly largely used for roofing purposes in Devonshire, Somersetshire, Gloucestershire, at Oxford, and around Horsham in Sussex, and make a picturesque and durable roofing material, and although heavy compared with ordinary slating have the advantage which tiles have over slates in that they are non-conductors of heat and keep the house cooler in summer and warmer in winter.

Advantages. — The advantages which slates possess are principally their non-absorbing qualities and their natural lightness as compared with tiles, which enables slighter timbers to be used in the construction of the roofs with which they are covered.

Disadvantages. — In appearance they are inferior to tiles, and the purple colored or dark blue kind from Wales are especially offensive to the eye. They have no weathering qualities, being of a cold, hard and unpleasing appearance, which in a climate like England is very depressing. (These remarks do not apply to the green variety of Westmoreland, etc., or to the stone slates described above.) Another objection to slates is that they are conductors of heat which makes the houses roofed with them cold in winter and hot in summer, which is a serious drawback when, as is generally the case in a country house, we have bedrooms in the roof.



LEAD.

Lead is not much used for the class

of houses about which we are writing, but is occasionally required for flats, etc. On reference to the table above it will be seen that it should be laid at a low pitch; when it is placed otherwise, it is liable to "creep" or "crawl" down the slope of the roof by the action of the sun. Lead is heavy and the timbers must accordingly be made sufficiently strong. It is laid in widths with the edges between the two sheets dressed over semi-circular wooden rolls, about 2 feet 3 inches apart, centre to centre. The "drips," *i. e.* the sinking where the overlapping of the sheets take place, are placed about every 8 feet down the slope of the roof so as to coincide with the length of the sheet of lead (Fig. 19). The lead should be left perfectly free to expand, and for this reason should only be nailed on one side, leaving the other free so that the whole sheet is able to expand. The nailing should be done with copper nails to prevent any galvanic action.

ZINC.

Zinc is laid much the same way, but as it expands more than any other metal great care should be taken that no solder, screws or nails should be used, but the zinc should be held in position by zinc clips, and should not be less than 14 gauge.

Messrs. Braby have done a great deal towards popularizing the use of zinc, and by only manufacturing the best material have done much to cause the reintroduction of the material in place of lead.

COPPER.

Copper is another material principally used for small ornamental roofs, such as turrets, bay-windows and the like, for which it is very effective. Copper oxides by the action of the air, and what is commonly called "verdigris" is formed on the surface; it is, as its name imports, of a bright green color, and forms a protection to the copper, itself preventing further oxidation.

SHINGLES.

Shingles are made of hard wood, such as oak, larch, etc. In order to be durable, care should be taken that they are split or torn and not sawn or planed. They are usually 12 inches long and 6 inches wide and about ¼-inch thick, and laid with 4 or 5 inch gauge.

They are principally used for roofs of a small description, such as turrets to roofs, bay-windows, summer houses, boathouses, etc., and are effective in these positions.

Banister F. Fletcher, A. R. I. B. A.

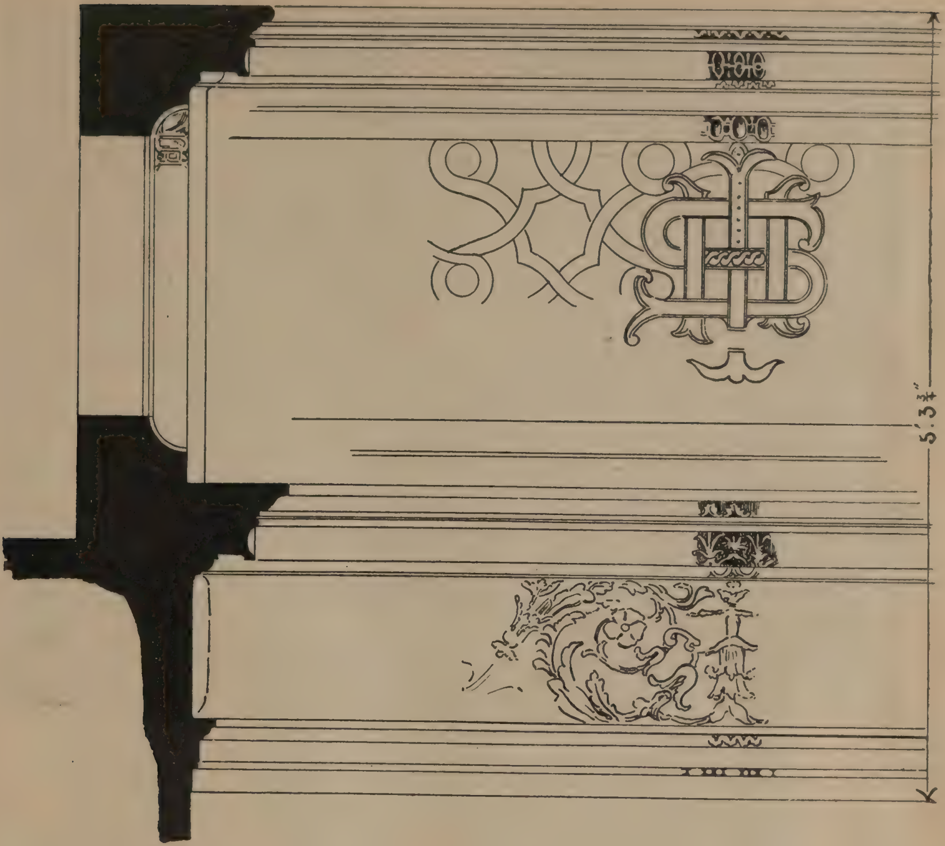
Near Lisieux. CHATEAU MESNIL GUILLAUME.

THE EARLY RENAISSANCE IN FRANCE.

IT seems strange at first sight that France, which had been the nursery of Gothic art and the home of one of its two great schools, should also, and at a very slightly later date, have become the seat of the most picturesque and graceful form of the Classic Renaissance; and yet such was the fact. By the commencement of the 16th century the Renaissance had become thoroughly established, not only in its birthplace, Florence, but throughout the Italian peninsular, and had shown that it was a style in which not only great and formal works were possible, but that it was capable of treatment in a light and tasteful way, open to the display of both delicacy and originality. Thus it was suitable to an imaginative, wealthy and progressive people, as the French were at that time.

Building, too, was passing out of the hands of the ecclesiastics into those of the rich nobility, and a period of comparative peace and ease was tending to the erection of comparatively unfortified châteaux, more suitable for the entertainment of large numbers of guests than for purposes of defense; and a departure from the Gothic methods of building, so closely associated in previous centuries with the erection of the great cathedrals of the country, was natural, and almost to be anticipated. Methods of planning, however, which had grown with the people and had been found suitable for their needs were not to be so easily cast aside as systems of decoration, and the result was that which is the delight of the modern seeker after the architecturally beautiful —the French châteaux of the time of François I. and subsequently, built upon Gothic plans with Renaissance ornaments of the most refined and delicate order.

But yet there was a little ecclesiastical work done, and it may be well to consider it before turning to the secular. Two churches, St. Eustache and St. Étienne du Mont, were erected in Paris at this time, the former a curious, lofty and inartistic pile, with attenuated shafts and pilasters designed in a manner suitable for small wood carving and executed largely in stone; the latter an incongruous mixture, picturesque by moonlight but utterly confused when viewed in daytime externally, while internally evincing Gothic unity of composition combined with Renaissance forms—though the pointed arch occurs round the channel. Its principal architectural feature, however, is the unique



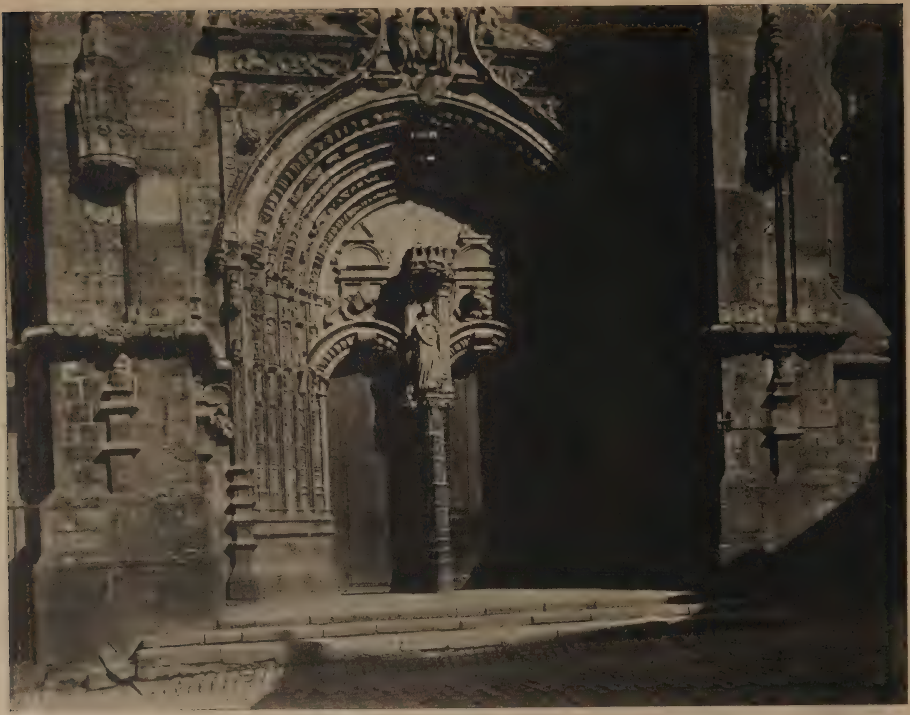
St. Étienne du Mont, Paris. DETAIL OF PARAPET—ROOD LOFT.

rood screen, with its flat elliptical arch of 27 feet span between two circular staircases, a portion of the detail of which is illustrated, and which bears the date of 1600 upon the underside of the keystone. It is a marvel of constructive masonry and full of instructive detail—instructive as showing how pliable are classic forms of ornament capable of original and artistic treatment such as is adapted to modern needs—the needs of the late 19th as of the late 18th century.

Outside of Paris, however, no new churches of the early Renaissance are found, but here and there additions have been made and repairs executed in the new style, the best-known example being St. Pierre at Caen, with its flimsy, wedding-cake like ornament. Much better is the southern side of the nave of the little cathedral at Guingamp in Brittany, where the native granite, necessarily used, has called for more solid, if decidedly quaint treatment, the effect in the western doorway being somewhat similar to that of Spanish work.

Somewhat more of the character of St. Pierre at Caen are the little Renaissance door, niche and buttress introduced at the west end of the south aisle of that little church of many dates, St. Alpin, at Chalons-sur-Marne; only in that example the slender ornament is not overdone, and serves but to accentuate and to enrich the plainer work around, while the flat mouldings and general refined delicacy of the early Renaissance contrast most markedly with the forcible rolls and hollows of the early Gothic central door.

Of church furniture, altars, screens,

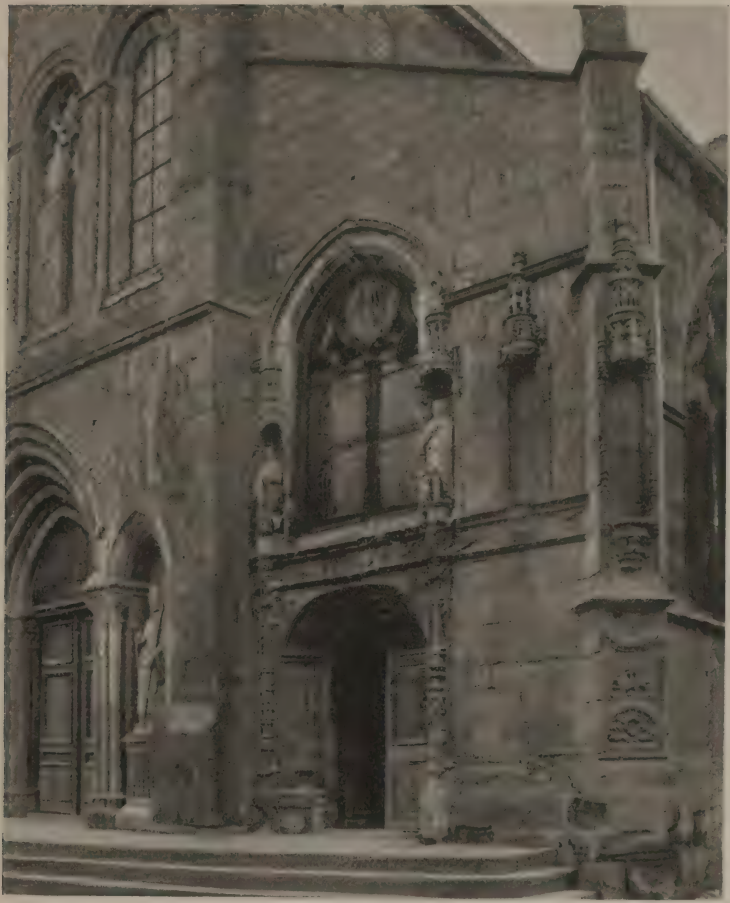


WEST DOOR—GUINGAMP CATHEDRAL.

doors and other movable fixtures, there are naturally many more examples, almost invariably extremely rich and beautiful. Of these, the altar in the north transept at Dol Cathedral, and the oak doors of the cathedral at Beauvais, and of the Church of St. Maclou at Rouen,are sufficient to give as examples, the former almost mistakeable for early Florentine, and the doors more wealthy in deep art enrichment and more characteristically French; but all good. The doors of St.Maclou, however, are later than the others, and so less made up of the elaborate canopy work of the early and middle 16th century, while more square and solid; for the canopies were relics of the previous Gothic style.

But in spite of numberless similar examples, it is in civil buildings mainly, as has been already said, that the influence of the Renaissance is seen, and to them it was apparently best suited. The châteaux are the best known buildings, large, imposing, often rambling edifices—according to whether they were early or late, and of one only or of several periods; but, passing by those whose names are household words, and whose photographs everyone has seen, such as Blois, Chambord and Chénonceau, three typical examples only can be mentioned here.

The Maison Fontaine Henri, near Caen, the seat of the Marquis de Cornulier is, if small, one of the most beautiful little erections on the continent, its charm being considerably enhanced by its lovely situation upon a wooded bank, reminding one of Heidelberg; its massing being so picturesque and thoroughly in keeping with the sylvan scenery. It is a jumble of high-pitched, almost perpendicular roofs, and tall dormers and chimneys rising above a wall of irregular plan, itself encrusted with rich ornament. Most of this, like



Chalons-sur-Marne. WEST DOOR—S. ALPIN.

the general arrangement, is late Gothic, rich traceried panelling and strings of crisp cut foliage, with transomed and mullioned windows, square headed or with the upper angles rounded off, and having interpenetrating mouldings, the ribs of which are each carried on a separate base; while imitation buttresses and ogee-curved hood-moulds, as well as traceried parapets go to complete the tale of Gothic features. Yet combined with these are slightly projecting pilasters, and panels and friezes carved in low relief with acanthus and anthemion scrolls, in which grotesque animals and birds are worked, and framing sculptured medallion portraits, the production of Renaissance workmen employed simultaneously, apparently, with those of the Gothic school; while superimposed orders rise up one side of the building, and the little well-head is purely Classic—freely treated Doric, beautifully proportiond, even though the rules laid down by the great Italian masters were considerably departed from.

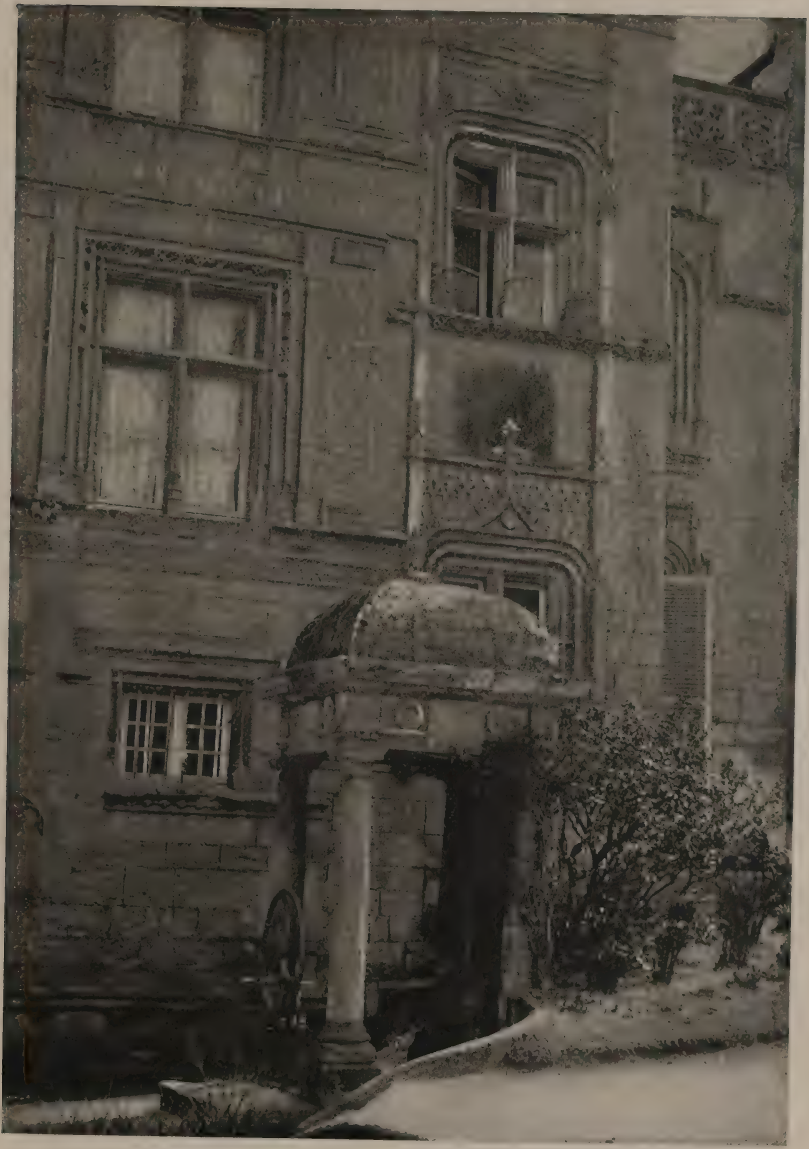
In the time of François I. the Renaissance became thoroughly established, and it is to that monarch and his nobles that we owe the foundation of all the most important châteaux. He, himself, loved best that built for him in the midst of the forest at Villers Cotterets, in the north of France, but unfortunately there is not much of it left now to attest its former grandeur.

SOUTH DOOR—BEAUVAIS CATHEDRAL.

it having suffered greatly from the British army after the battle of Waterloo, and during subsequent events. Now, a "Maison de retraite," or species of government almshouse for old people, has been erected upon its site, the old front, throne room and two staircases, or so much as remained of the original building, being incorporated in it, carefully repaired and restored where necessary by the supervising architect.

The little sketch accompanying this gives a fair idea of the decoration, the shell ornament over the niche, the Salamander (the emblem of François I.) in the pediment, and the small nude figures on the pediment, together with the exquisite proportioning and modelling of the parts, being characteristic of the entire period.

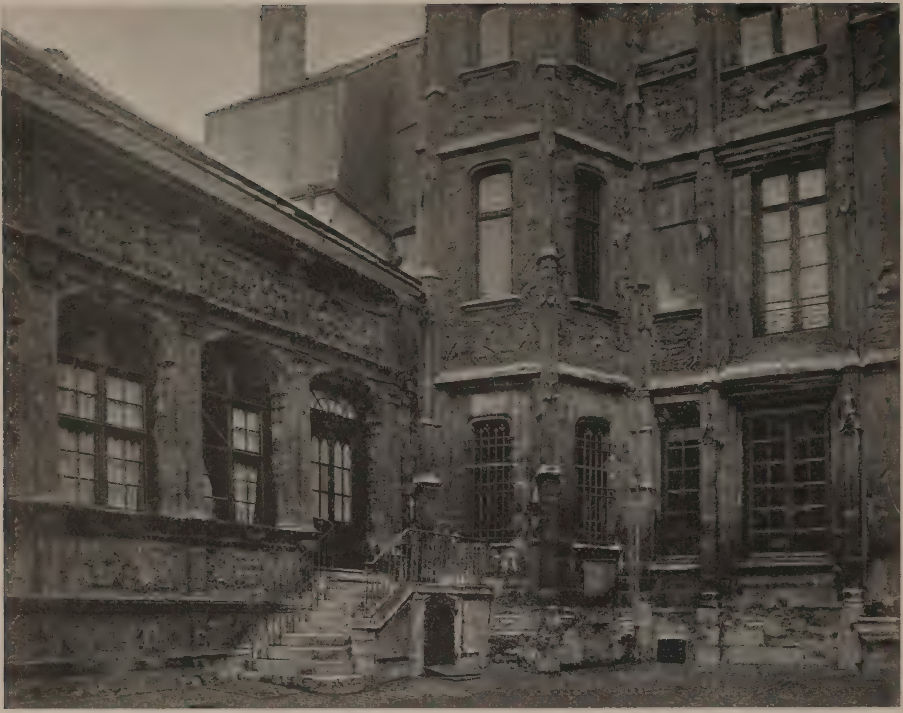
A little later and the châteaux, particularly the small ones, like that of Mesnil Guillaume, near Lisieux, reverted to the square "keep" plan of the Gothic castle—or, perhaps we may say more correctly, were built on the lines of the square courtyard and palaces of Italy, with the addition of an external moat. Heavy cornices now became the fashion, under the heavily projecting eaves, and the ornament deteriorated, following the usual course of the Renaissance alike in Italy and France and England; but yet the large and square low building, once more of



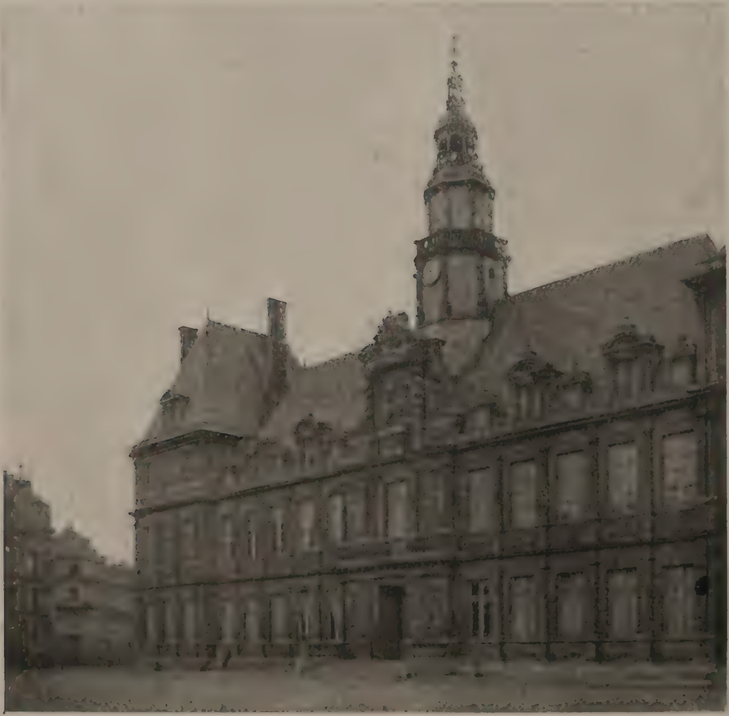
Near Caen. WELL-HEAD—MAISON FONTAINE HENRI.

semi-military character, still possesses unity and picturesqueness, and the lack of good detail in stone or wood is frequently compensated for by charming bits of ironwork.

Of less importance than the châteaux, but yet quite as characteristic of the times, are the buildings pertaining to the municipalities, which in France, as in their neighbors on north and south—Italy and the Low Countries—were rising into great commercial importance. Everywhere trade was flourishing, and, as a natural sequence, everywhere there was much building of a sumptuous kind. In Rouen alone, most mediaeval of French cities, there are two well-known examples of the François I. period—the Grosse Horloge and the

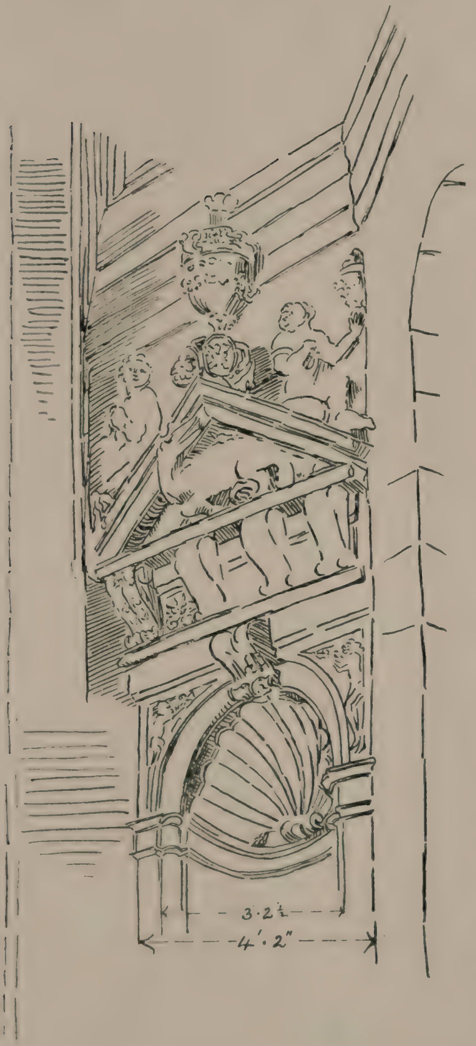


Rouen HOTEL BOURGTHÉROULDE.



Reims. HOTEL DE VILLE.

Hôtel Bourgthéroulde. The former of these consists of an arch over a narrow street, supporting the great clock from which it takes its name, and, with its flanking walls, forms but an adjunct to a yet older building, of which the tower yet remains. It was erected in 1527 A. D., and is full of rich carved detail, some in low and some in high relief, and is so varied in design that no two capitals, and not even the two halves of the same capital, ever exactly correspond, though balancing in perfect harmony. The latter, the Hôtel Bourgthéroulde, is literally encrusted with sculptured ornament, executed in the soft limestone of the district which is decaying rapidly. A famous series of panels represents the meeting of François I. with Henry VIII. on the Field of the Cloth of Gold, and contain a great number of contemporary portraits of the persons who took part in that event; but the architecture, though exceedingly elaborate, can scarcely be considered to be true, as the design is more suitable for execution in wood than stone, turned, or apparently turned, balusters being introduced in the window jambs to serve the purposes of attached columns. It is a trick which of late has found much favor in England, especially with workers in terracotta—or, possibly, an error of judgment rather than a trick, due to want of consideration of the treatment demanded by the material being dealt with more than any deliberate intention to use ornament only truly applicable to a material which could, in actuality, be turned in a lathe, and so to deceive the unwary into the idea that stone and terra cotta were capable of such usage.



Niche in Main Recess Over Entrance—Chateau de Villers Cotterets.

By the time the Hôtel de Ville at Reims was built in the reign of Henri IV. the builders had gone further, and were even using twisted columns with natural ivy and other creepers twining round them; but the general designs had become more formal, with an attempt to use orders in a stiff manner and in conformity with rule, the eye, and the native French perception of proportion, being no longer trusted, with the result, of course, of the production of lifeless forms in place of the imaginative and the beautiful of the previous century.

The country abounds with similar examples to those here mentioned, which are scarcely even the great examples but only such as occur in profusion almost everywhere. To see them all would occupy a lifetime—to describe them properly, many a large folio volume.

G. A. T. Middleton.

SCULPTURE AS APPLIED TO THE EXTERNAL DECORATION OF PARIS HOUSES.

TWENTY years ago the external ornamentation of French houses was, in general, of a very sober character. Sculpture had little or no part in it. With the exception of certain districts inhabited by the nobility the house fronts were all alike. It was an unbroken dullness, an uninterrupted poverty of decoration. A few mouldings on the cornice, or some rosework or some pellets on the frieze, or a little vermiculated work on the basement, were considered marks of great luxury. To go beyond this—for a cornice to be supported by caryatides, for instance—was an extraordinary proceeding. Even to think of it was regarded as a sign of extravagance and want of sense. We will cite the case that occurred about ten years ago of a scrivener's son, who, having inherited a million dollars or so from his progenitor, narrowly escaped seeing his fortune placed under the care of a legal guardian on the simple ground that he had spent 50,000 francs on the sculptural decoration of the façade of his house. His mother pressed urgently for this measure, and it was only by a miracle that he managed to avoid losing the free disposal of his property.

Those were good times for incapable and indolent architects. Their plans were simple, and, we may add, always the same. They had not to worry about giving variety, brightness or majesty to the lines and displaying the riches of their science or the fertility of their imagination. We cannot blame them if the majority of the houses erected in the first two-thirds of this century indicate no attempt at art and no creative power. The architects just followed the instructions of their clients, who, fonder of their shekels than of art, and only anxious about being comfortably housed, had no sense of beauty or yearning after elegance, and recognized but two good qualities in a dwelling—in the first place cheapness, and secondly, convenience. The state of things at the present day is no longer the same as it was then. Although our upper middle class have preserved a touching regard for economy—what we call *l'amour du bas de laine*—there seems to have sprung up, in these closing years of the century certain wants and desires of a more refined and elevated character. No doubt their artistic education is far from being complete; no doubt they still lack a sound conception of the beautiful, and can be induced to believe that Will-o'-the-Wisps are lanterns. Yet it is evident that the trivialities amid which they take their ease no longer satisfy them, or, to put it in other words, they are no longer at their ease amid those trivialities. Things graceful, genteel and sumptuous have ceased to be the appanage of a select few. During the last few years a comprehension of artistic things has manifested itself in everybody to a greater or lesser extent. Molière said: "Le mauvais goût du siècle en cela me fait peur." Were such an opinion expressed now, it would be uncharitable, if not unjust. Our contemporaries may not possess an exquisitely fine sense of the defects and the beauties of works of art, but they at least show a genuine desire to acquire it. However downy and softly lined a piece of furniture may be, it is not thought much of by a Parisian of the year 1896 if its style is not harmonious or if its curves have not at least a pretension to majesty and elegance. Even in the lower middle classes we find dwellings that have the aspect of little museums. Every day these apartments are more and more crowded with beautiful objects; articles of virtu made expressly to please the eye; and it seems very natural that this growing craving for luxury should overflow the halls and drawing-rooms and display itself on the house fronts.

It might almost be laid down as a law that the outside of an edifice reveals the nature, aspect and purpose of the interior. Some of our young architects are inclined to extend this law as far as possible. They are partisans of what may be termed speaking architecture. According to them, the ornamentation of an edifice ought not only to make known its purpose, but should, besides, proclaim the owner's profession, or even some episode in his life; further, still, it should relate any historical scene that may have been enacted on the spot where the edifice is erected. Thus, M. Paul Héneux, having been entrusted with the erection of the new Town Hall at Les Lilas, a charming little place near Paris, conceived the idea of treating all the sculpture of the building with lilac. The capitals, the balcony, the frieze, and the flowerwork placed above the dormer windows, represent nothing but sprays, bunches, leaves and petals of lilac. The brackets of the windows are also formed of flowers of the same spring shrub. As to the baluster of the grand staircase, it represents a trellis with branches of lilac climbing over it. Yet the architect has avoided monotony, and has produced the most graceful variations upon the single theme adopted by him. We will also mention a house designed by M. Paul Héneux. In this case all the sculpture has been inspired by the profession of the owner, who is a druggist. The frontals of the dormer-windows of this house are ornamented with garlands of mallows and poppies. The frieze is composed of Renaissance motives in the ornamentation of which other medicinal plants figure. Finally, on the first story there is an escutcheon that recalls the origin of the fortune of the owner, who is the disseminator of some kind of ointment or elixir. Not far from this house—a fact which tends to prove that this style of speaking sculpture is spreading in Paris—there is another dwelling, belonging to the Abeille Insurance Company, all the decoration on which consists of bees, hives and honeycombs. In an adjoining street a large export house has pilasters ornamented with Mercury's wands and a frieze representing exotic fruits and plants, while the caryatides of the two large doors at the entrance stand for Europe, Asia, Africa and America. No doubt this sort of decoration may appear somewhat specious; but however specious it may be, it is sufficiently interesting, and already sufficiently common, to justify our mentioning it here.

A hankering after novelty, a desire to have something that has not been seen before, is beginning to get possession of us. Quite the opposite of our fathers, who, with few rare exceptions, took fright at the slightest attempt at originality, we all try more or less to do something that is out of the common. It may be that in so doing we follow the example and the impulse which have reached us from the New World. It is well to note, also, that in consequence of the teachings of Gustave Flaubert and Paul Verlaine, of Carpeaux and Auguste Rodin, a triple revolution has taken place in France—a revolution in literature, in painting, and in sculpture. Our minds and our eyes have become weary of stale styles, and at a time when all the arts are being rejuvenated our architecture also has felt the need of new life; it realizes the necessity of going forward at a moment

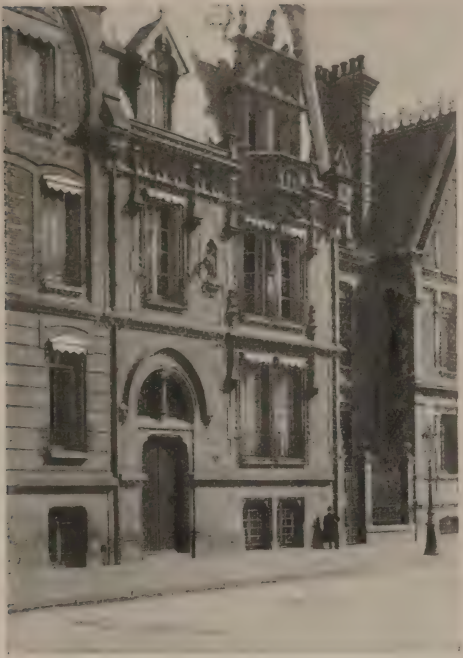


FIG. 1.

when the Unknown is retreating step by step before the advancing sciences.

We do not know whether our architects have yet attained any great results, at least in their general plans. A sort of fatality causes them to stumble incessantly against the solemn five orders, and, notwithstanding all their efforts they fail to free themselves from the ancient styles. Let us, however, congratulate them upon having discerned amid those old styles the purest and most harmonious of them, and upon having preferred above all others the admirable influences of the Gothic and the Renaissance. After all, even if our architects are most frequently inspired—and sometimes happily inspired—by these two styles, they take care not to copy them servilely. "If we always do the same thing," said one of them to us wittingly, "we don't always do it the same way." Hence result constant attention to motives of detail and an endeavor to vary the ornamentation of new houses failing variation in their structure.

Persuaded that the view of a thing is far more eloquent than a description, however minute and precise it might be, and especially so in regard to our present subject, we should have liked this article to be illustrated by a very large number of photographs. Unfortunately, some of the most artistic Paris edifices are located on avenues and boulevards, and the trees that line these boulevards and avenues have in some cases prevented our photographer from taking certain negatives that we desired to have. Still, we are convinced that the series of photographs here reproduced will give a sufficiently clear and synthetic idea of the sculptural ornamentation of the exterior of the houses now being constructed in Paris.

Our first illustration represents a private house in the Gothic style. It attracts and charms the eye by its graceful and harmonious aspect. The architecture is at once picturesque and logical. The details of the ornamentation are in accord with the whole work. The chambranle of the door with its sober and elegant archivolt,

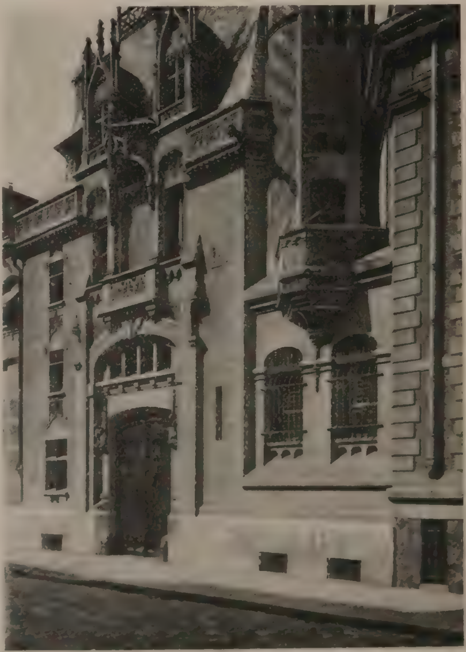


FIG. 2.

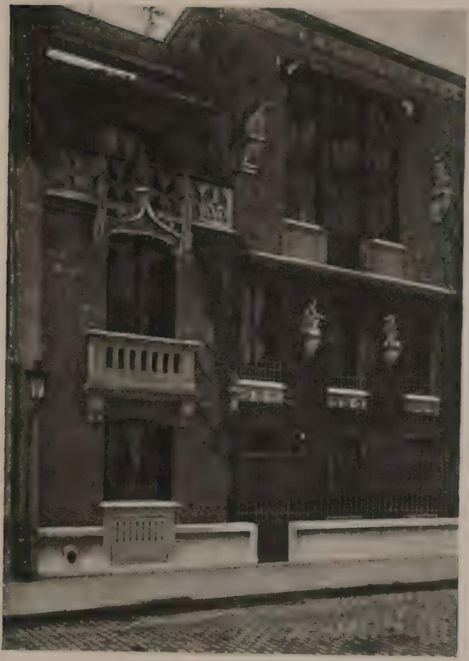


FIG. 3.

and the chambranles of the windows, are quite in the style from which the architect has drawn his inspiration. The frieze is very handsome, and is skilfully broken by the balcony, which is supported by a console resting on a small column similar to that of the door arch. The architect might have increased the number of the figures, but he has had the good taste to leave this display of luxury for cathedrals, contenting himself with a cat, a gargoyle and a watch-dog. We even regret that the last named, who emerges symbolically from his niche, should have been placed on the first story. From a decorative, as well as from a symbolical point of view, he would have been more effective between the door and window of the ground floor.

There is, perhaps, no art that requires more delicacy and *finesse* than the art of ornamentation. Everybody appears to admit the principle that the ornamentation should arise out of the general form itself; that all the special details must be in harmony with the original idea and contribute to the synthetic aspect. Everybody seems to admit this principle, which is not merely a principle of architecture, but of art also; and yet, in practice, we often see this undeniable principle ignored. Thus, a number of Paris houses are so wanting in unity that one would imagine them to be the result of two distinct operations: first, the building, and afterwards the ornamentation. This error arises, no doubt, from an excess of ingenuity on the part of some of our architects, who unwittingly allow themselves to be dazzled by the fascination of the detail and do not sufficiently take into account the essential point, namely, the general form. Our second illustration affords an example of this kind of mistake. It represents the house that was formerly inhabited by Madame Sarah Bernhardt. This abode of the eminent tragédienne was in the Louis XIII. style, brick and stone. A very picturesque part — too picturesque even—has been added as an afterthought. That is evident. All

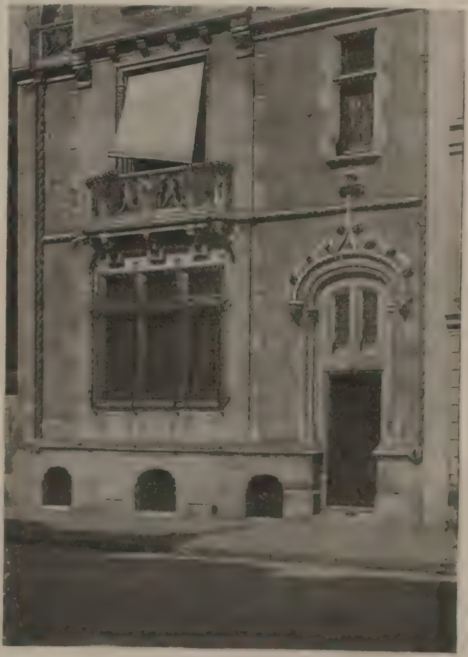


FIG. 4.

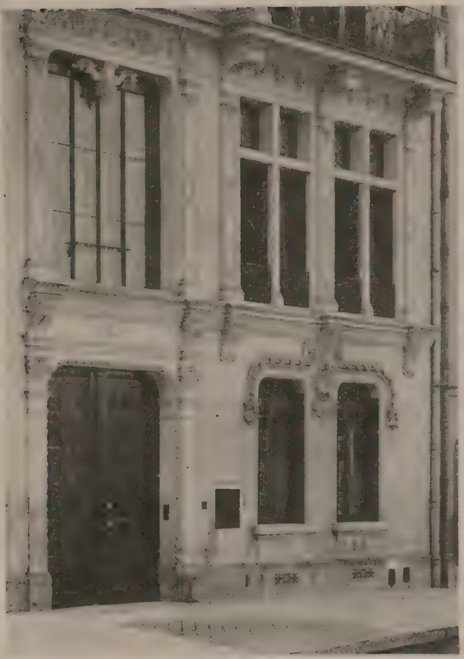


FIG. 5.

the sculptural and ornamental portion has been treated by a man who was undoubtedly clever and imaginative, but who attached no importance to the original conception, and has consequently disfigured, or at least debased it. Certainly, this house may please at first sight by its very strangeness, and some of the details of its decoration, taking them apart from the rest of the edifice, are worthy of attention. Yet it is none the less true that the work is lacking in homogeneity and connection. The numerous affected little motives, the turret, and the inaccessible balcony—all this is vaguely inspired by the house of Jacques Coeur, at Bourges: it is illusory and clashes with walls so different in style.

Nor can we approve of the mixture of luxury and rustic simplicity shown in the house pictured in our third illustration. But the purpose of this article is to give as exact an idea as possible of the external ornamentation of Paris houses, and not to confine ourselves to a few preferred examples. Hence, it was useful to include here a specimen of a kind of edifice that is held in some favor in this city. Leaving our readers to make their own commentaries, we will single out the Gothic crown of the left-hand window, the large window with its iron lintel, and the two salamanders, also in iron, that decorate the bressummers. Let us also draw attention to the four stone brackets dressed like rockwork, the two on the lower story supporting two athletes, and those on the upper story, two dogs sitting with a nonchalant air.

The Louis XV. house, the characteristic part of which is depicted in our fourth photograph, is treated simply and in perfect taste. While drawing inspiration from Blois Castle, the architect has displayed a delicate and circumspect art of his own. The balcony is really remarkable. It is charming in every detail. The three little monks that support it and behind which fabulous small animals are intermingled, are sculptured with great care, as are also the gargoyles and the graceful moulding which extends over

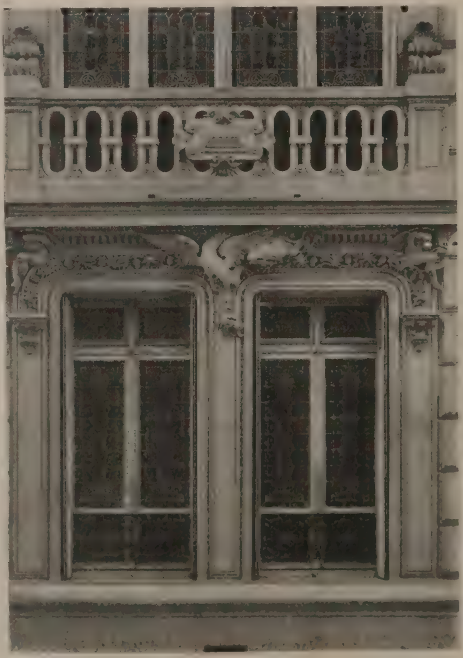


FIG. 6.

the voussoirs of the door. We would point out, too, that the window grating is a delicious piece of ironwork. Such a dwelling might well take the fancy of one of our transatlantic readers. If so, and if our reader should find the house too small, it would be easy for him to enlarge it by placing to the left of the door a building similar to that on the right. The house would thus be increased by more than a third, and would lose nothing thereby; it would, perhaps, even gain in elegance and harmony.

The façade shown in our fifth illustration appears to us equally pleasing. It is in a very agreeable and very graceful form of the gothico-renaissance style. The proportions between the full and the open parts are exceedingly happy. The sculptures on the frieze, on the pendentive of the left-hand window, and on the consoles, are elegant and full of nobility. The architect has disdained ornament for the mere sake of ornament. Although he has paid great attention to the window frames of the ground floor, it is not at the expense of the general appearance; and if we detect a certain excess of refinement in the fabulous animal that bears the escutcheon and in the volutes flanking it, we must admit it is not very loud or affected.

Our next photograph shows two ground floor windows, the ornamentation of which recalls in certain points the ornamentation of the two windows belonging to the preceding illustration. This enables us to draw a curious parallel. Evidently the architects of these two houses have both bestowed great attention upon the sculptural decoration; but it is not difficult to gather that their efforts have not been equally successful. The dragon and the little imps which, in our sixth illustration, bear the plat-band and the balcony, are certainly very delicately worked; but they are somewhat out of place beneath a balcony and a plain moulding in the Renaissance style and above two windows of Gothic architecture. One is also astonished to see those balcony consoles, which are modern, thus bringing together, without transition, three styles that clash terribly. Therefore, at the risk of repeating ourselves, we will again give a word of warning to those who, unreflectingly pay so much attention to the application of vain arabesques, and who, puerilely absorbed by this captious decoration, lose sight of the general plan. We welcome as cordially as anybody all efforts that are really new and original. It is, however, necessary, that this originality should consist in something besides haphazard amalgamations of dissimilar styles. If a man appeared in public dressed from neck to knees like a page, with a high hat and Wellington boots, would that be sufficient to justify the assertion that a new kind of costume had been invented? Would such a person even be considered original? In the same way, before thinking of any ornamentation whatever, it is necessary to create the form, and then, when the form is found, it has to be ornamented in a logical fashion—in such a fashion that form and ornamentation shall be in absolute harmony, and even appear inseparable and inevitable. Artists in general, and particularly architects, who are not sufficiently impregnated with this truth, expose themselves to serious mishaps. We greatly fear that this is the case with the architect who is responsible for the construction of the house the astonishing façade of which is shown in our seventh illustration. Verily, this architecture is quite modern—modern at all events in the sense that it does not resemble anything done previously. But if by modern architecture is meant architecture appropriate to our present needs and tastes and taking account of recent inventions—telephones, lifts, etc.—then the example in question is as little modern as could be. Those four consoles in imitation of the buttresses of a church do not serve any purpose whatever; neither, for that matter, does the escutcheon of doubtful heraldry supporting a column which goes with the balcony above about as gracefully as a stove pipe

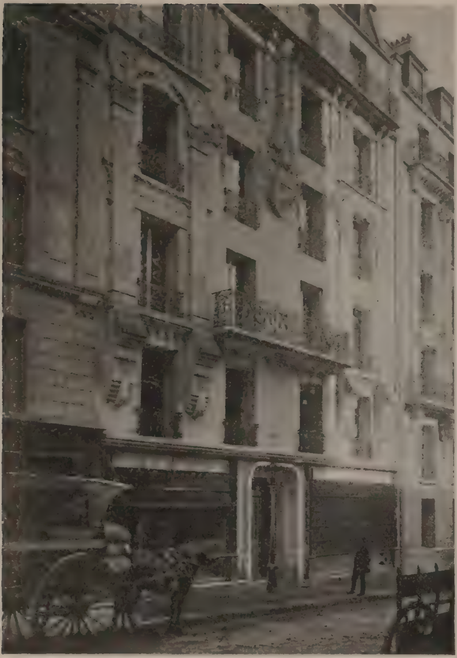


FIG. 7.

would do. Those ornaments near the capitals are without motive or use, and the rest of the decoration is not much better. One may well ask what aim the architect of this building had in view. It is difficult to believe that he wished to produce something artistic. Perhaps he desired to revive the art of decoration. If so, we can only hope that he will be better inspired in his future efforts.

The house shown in the next photograph (No. 8) seemes to us not less original. But, at least, this one is the work of an artist and it responds, also, to a special taste. All the private apartments are together; the dining-room and smoking-room on the ground floor, and the bedrooms at the top of the house. The immense window, which lights a large hall, is treated in the Renaissance style, and the harmony of all its details is perfect. We would specially point out the pleasing proportions of the mullions and their pilasters. The delicately sculptured frieze represents cupids who are waving streamers, which they tie and untie around beautifully chiselled medallions. The garret window, comprising two stories, is very elegant with its Corinthian pilasters and capitals, its frieze and its fronton, in the center of which appears a head bent inquisitively towards the street. This garret window finishes off the house in a very successful manner. It will be remarked that only the windows and their frames are decorated, the walls remaining plain in order to heighten the effect of the said windows and frames. Of course, such architecture could not be resorted to generally; but a building of this kind is eminently suitable for a collector—for an artist who desires to devote the best part of his house either as a splendid gallery for his collections or as a studio for himself, where his tastes and his work as an artist impel him to pass the greater portion of his time.

Our ninth photograph shows an abode that is evidently more practical, generally speaking, than the preceding one. The style is rather mongrel,

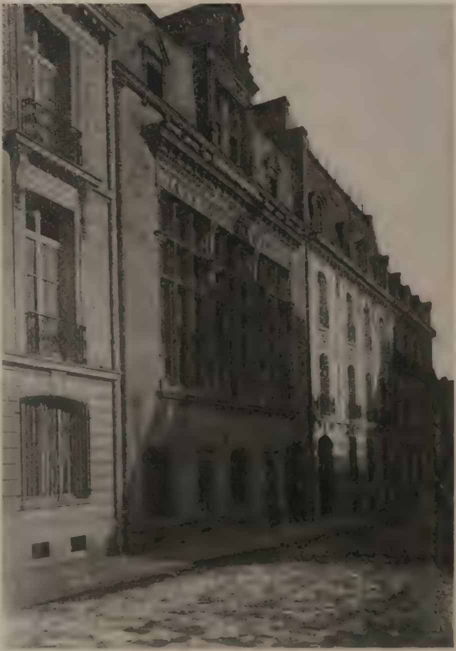


FIG. 8.

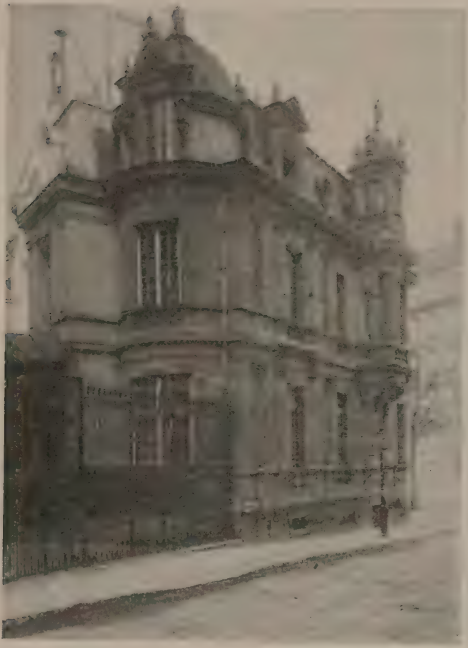


FIG. 9.

but the architect has at all events had the skill to combine out of dissimilar motives a sufficiently harmonious whole. Apart from those unsightly chimneys that disfigure it, the house is, in the main, pretty and pleasing. The projecting Renaissance turret resting on consoles has an exquisite effect, and we see no reason to reproach the architect for having sought inspiration, for the treatment of the upper part, in the skylight of the staircase of the Ecoville mansion at Caen. It is a pity that he did not also copy the fine decorative chimneys of former times and spare us the sight of those horrid modern stove-pipes!

In our tenth illustration is seen a specimen of a kind of construction which, treated with discernment, may be made very elegant. In the present case the architect does not seem to have succeeded in giving his work the air of distinction at which he certainly aimed. He has fallen into the usual error, namely, the dangerous confusion of styles. Taken by itself, that Renaissance attic story has a handsome appearance. The niches and the pilasters are quite in harmony. The motive above the attic and which is surmounted by the arms of the owner, is not without charm, while the choice of the three statues, their attitudes and their execution bear witness to a genuine sense of the beautiful. Why is all that marred by the remainder of the building? Why is the ornamentation entirely confined to the upper part of the edifice? Above all, why is this upper part, which is in the Renaissance style, placed over a basement and a first floor in a Louis the Eighteenth style? One would say that the work was conceived at two different times, by two different architects, and that, for some inexplicable reason, the two parts were joined together. In acting thus, it is true that a certain amount of talent can be displayed, but it is not architecture.

We have said that houses surmounted by an attic story afford scope for considerable elegance. They have

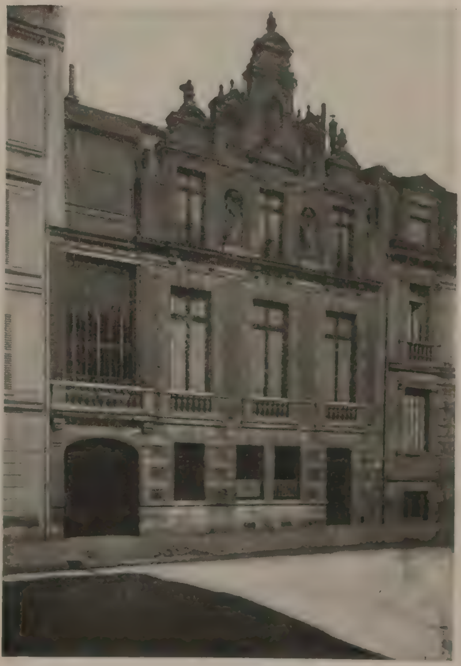


FIG. 10.

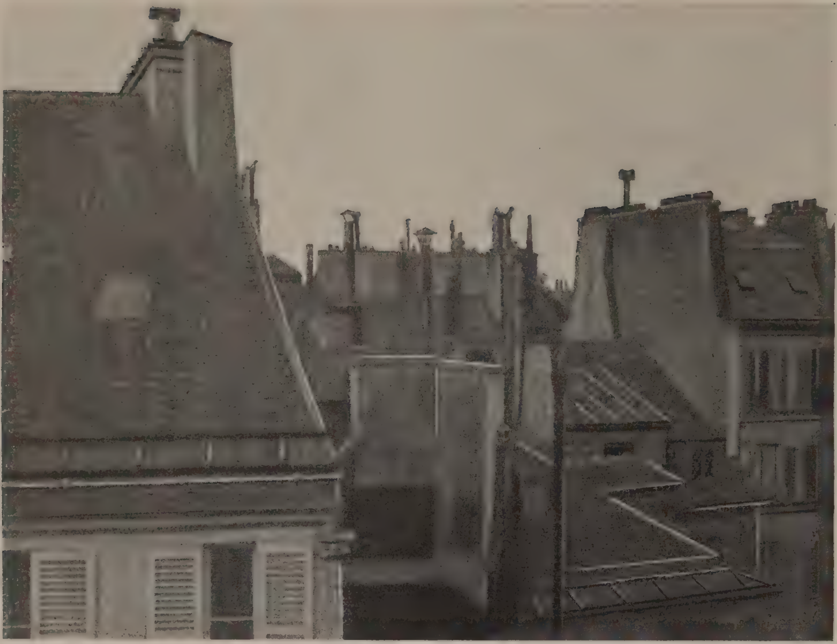


FIG. 11.

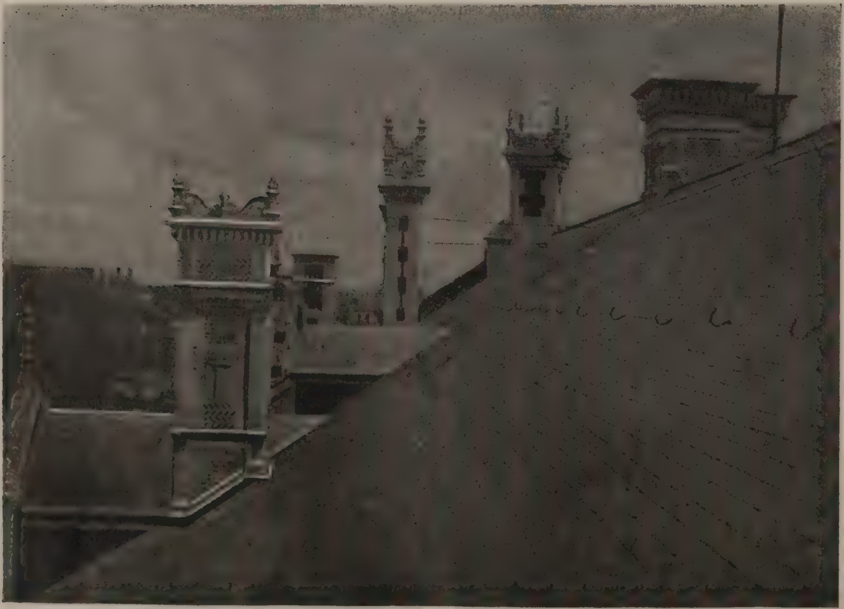


FIG. 12.

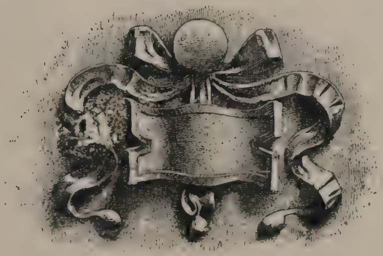
[illegible] PUBLIC LIBRARY

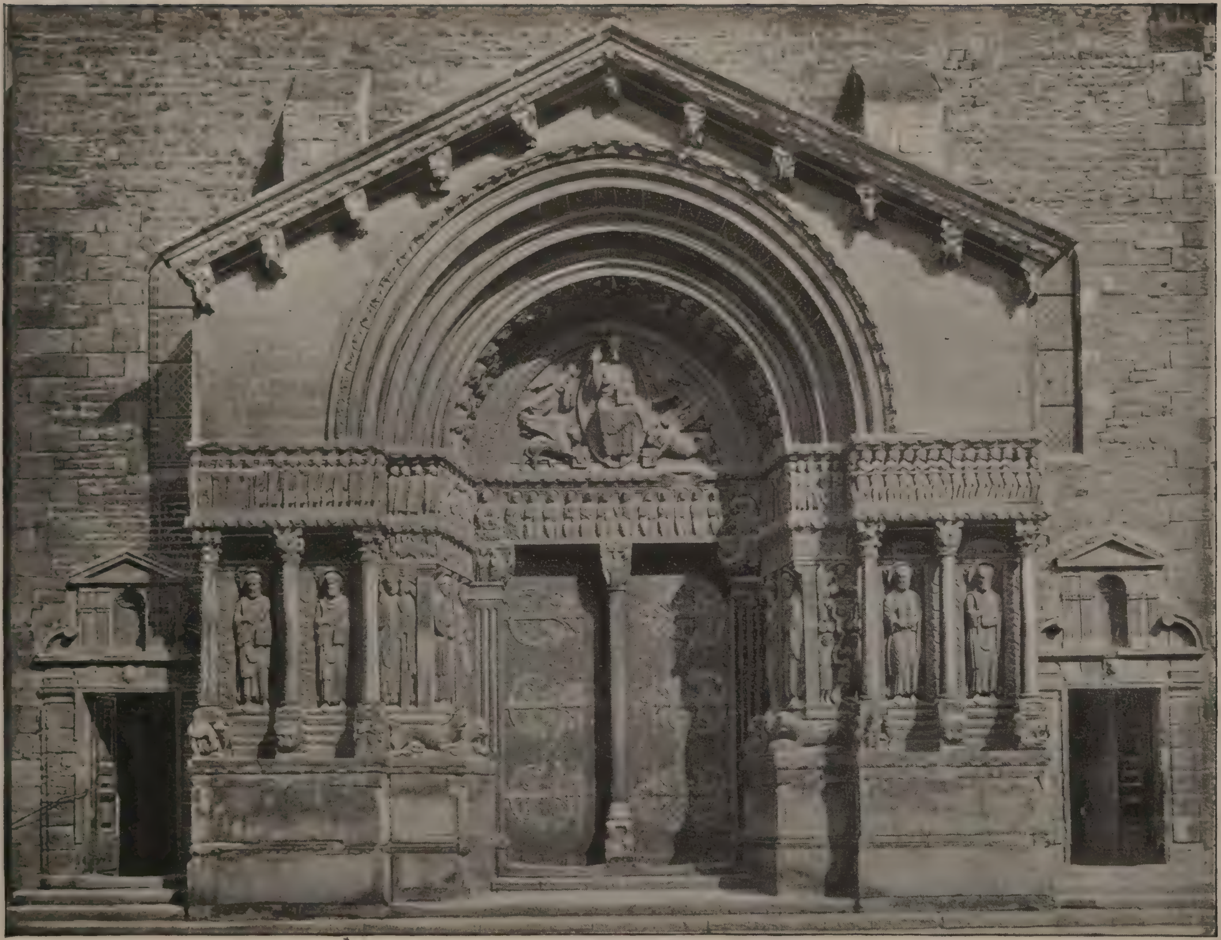
besides, one incontestable advantage; they help to hide those wretched modern chimneys of which we have just spoken. And it is really necessary to disguise them, seeing that we seem to have forgotten the art of rendering them attractive by decorations *ad hoc*. With a very few exceptions, the roofs of Paris houses have now a deplorable aspect. An idea of this can be formed from the photograph (No. 11), which we put before our readers. It has seemed to us that it would be rather amusing to place alongside of this view another one representing some roofs ornamented with the sort of chimneys that used formerly to be put on first-class houses. This simple parallel speaks for itself and will suffice to show what talent our predecessors were able to bring to bear upon even the most ordinary things. (Fig. 12.)

Cannot contemporary architects do as well as those of former generations? In view of the new needs, and with all the new resources of modern life, will no young architect of talent come forth and endow us with a style that shall be in accord with our tastes and requirements? The houses of to-day are provided with lifts, telephones, electric bells, and the electric light; and if, on the one hand, it is depressing to give them the appearance of a factory, it is, on the other hand, an outrageous anachronism to surmount them with an Ionic entablature, for instance, or a Byzantine dome.

Upon the whole, modern architects seem to us to be remarkably well-informed in regard to the ancient styles. They are past masters in the art of appropriating. They also know, when required, how to erect works and manufactories arranged in accordance with the most practical ideas of our day. This being so, we think that the time has come to take into account beauty as well as utility—in a word, to proceed synthetically.

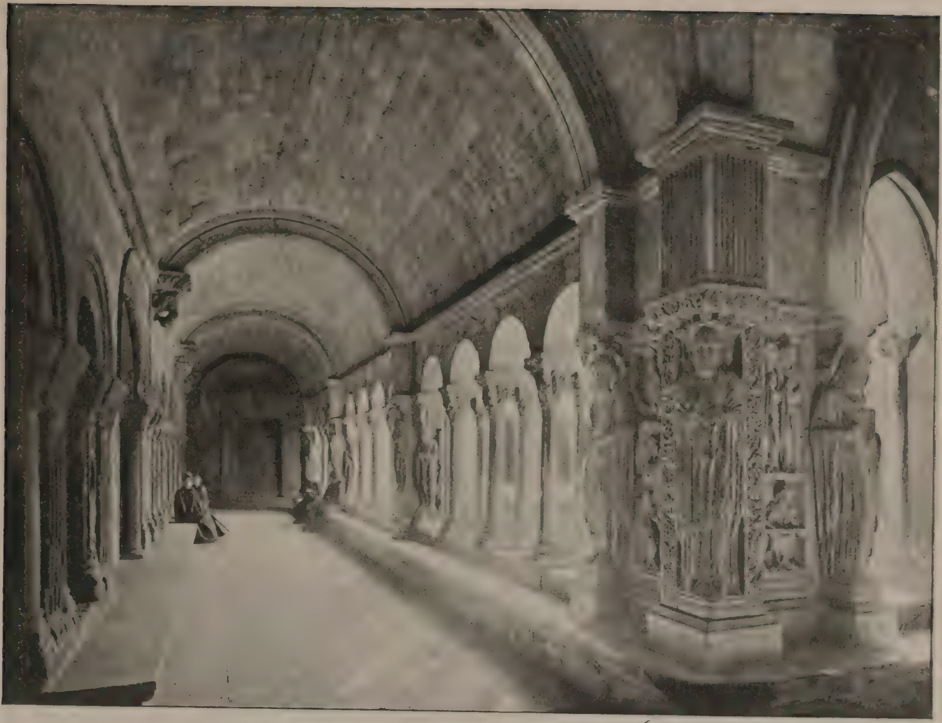
Fernand Mazade.





WEST PORTAL, CATHEDRAL OF S. TROPHIME, ARLES.

BOSTON PUBLIC LIBRARY.



S. TROPHIME, ARLES, NORTH GALLERY OF CLOISTER.

FRENCH CATHEDRALS.

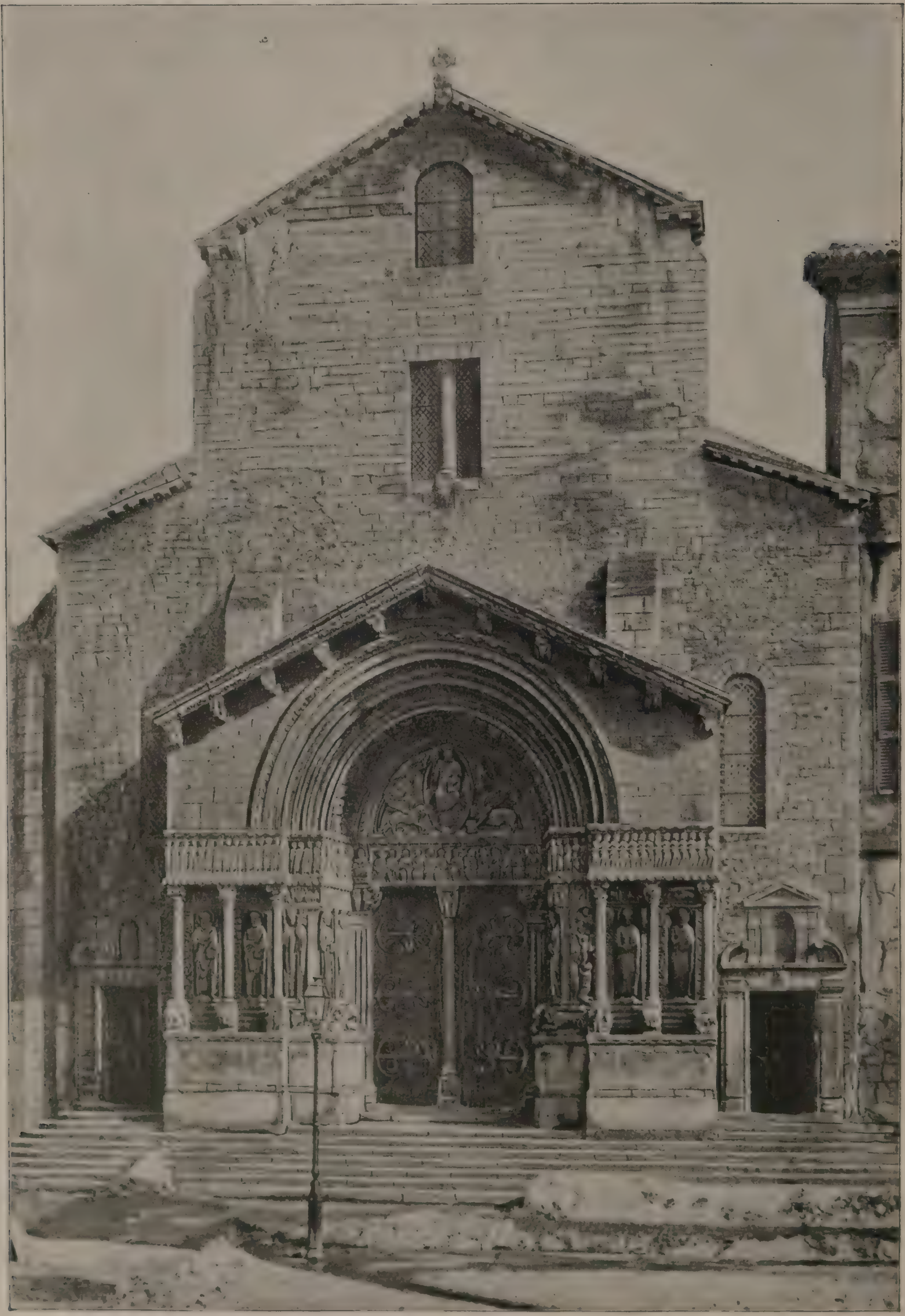
Part VIII.

THE CATHEDRALS OF PROVENCE.—IV.

I.

THE Cathedral of S. Trophime at Arles is at once the most famous and the most important of the cathedrals of Provence. Few cities of France have had so varied a history as Arles. It reached its utmost splendor under Constantine, when its population exceeded 100,000, though today it does not equal a quarter of that number. In 879 it became the capital of the kingdom of Arles, and in 1150 a republic, and its people to-day still retain many peculiarities of appearance and of disposition that attest their ancient lineage. Always the centre of active life, it was natural that the cathedral church should be a structure of unusual interest. An archbishop no longer occupies its episcopal throne, but its great church still fascinates the student and the traveller, delights the artist and the seeker after the rare and the beautiful. Its western portal is one of the most sublime products of the sculptor's art in the south of France; its cloister is scarcely less renowned and beautiful; its nave is a most interesting type of Provençal Romanesque, but its late Gothic choir destroys the symmetry of the ancient fabric and introduces an unpleasant note of discord into its stately interior.

Called S. Étienne prior to 1152, when the remains of S. Trophime, the Apostle of Arles, were transferred in solemn state from the church of S.



CATHEDRAL OF S. TROPHIME, ARLES—WEST FRONT.

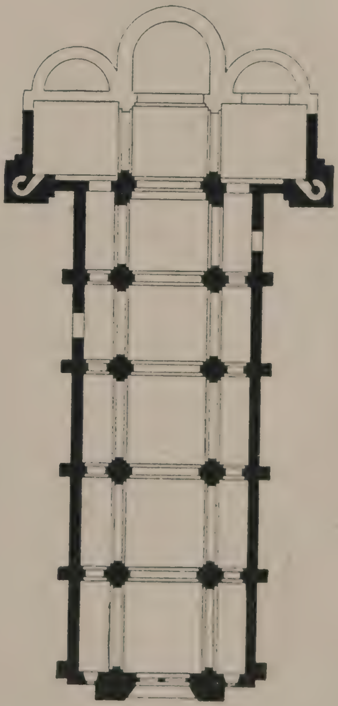
BOSTON PUBLIC LIBRARY.

Honorat to the cathedral, which then assumed its present name, the history of the church goes back to the time of Constantine. At least it is known that a church of St. Étienne existed in Arles as early as the first quarter of the fifth century, and it is not unreasonable to infer that it had been in existence for some time before. Although its early form has been utterly lost to us, the primitive church must have been an edifice of considerable importance. Three councils of the early Church were held within its walls, in 314, 442 and 451, which brought together prelates and clergy from many parts of the Christian world, testimony alike to the importance of the city and to its religious activity. The most important of these councils was the first, at which the Donatists were condemned. In this church, also, S. Augustine, the Apostle to England, was consecrated bishop, and its early history is filled with the names of holy saints, many of whom have left their mark upon the church at large, as well as upon the city of Arles.

II.

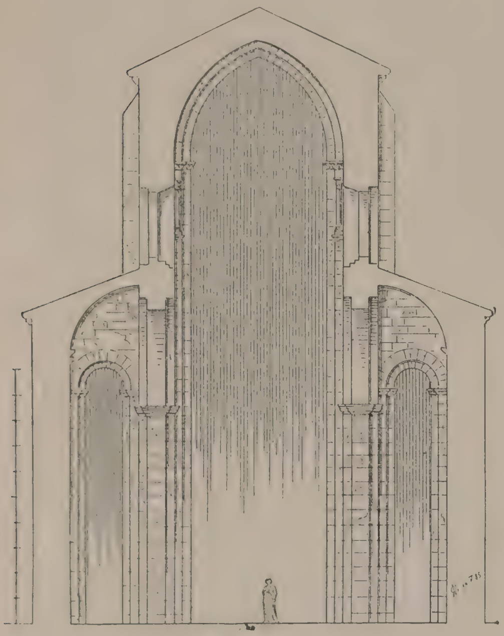
Of the date of the building of the older parts of the present cathedral nothing definite is known. M. Révoil does not hesitate to attribute it to the ninth century, and other writers have dated part of the walls of the façade and of the aisles to an earlier period, with a general reconstruction in the eleventh century. The earliest authentic date we have is 1152, when the name was changed to S. Trophime. The entire rebuilding of the choir, by the Cardinal Louis Allemand, begun in 1430, totally modified this portion of the edifice, but the nave and aisles, and parts of the transepts still retain their Romanesque character. In plan the church closely resembles the cathedral of Vaison, differing in its larger dimensions, and in having shallow transepts, to which were applied semicircular apses that, with the central apse, completed the east end, and all of which disappeared in the building of the new choir. It was thus almost identical with the Cathedral of S. Paul Trois Châteaux, with which it has many features in common.

The nave consists of five bays with a pointed tunnel vault, and with narrow aisles, whose vaults have a quarter-circle section. A transverse section shows a striking similarity with the cathedral of Vaison, but the proportions are different. All parts are loftier and narrower, the nave vault rising above a sort of clearstory over the aisle, but the structure is the same, and its position in the chain of Provençal churches not less apparent, though its proportions give it a loftier aspect and a more impressive interior than any other church in Provençe. The piers, as in other aisled churches of its epoch, are formed of an assemblage of rectangles, a broad pier with a projecting centre carrying the double arches of the nave vaults, which like the piers, are without ornament.



Plan of the Cathedral—XII. Century.

There is the suppression of ornament usual in the churches of the eleventh and twelfth centuries, the only relief being a band of acanthus leaves at the base of the vault and around the piers, where it serves as a capital. The aisle piers, which form part of the main piers, have small plain moulded bands for capitals, stopped by the piers of the nave arches. The outer piers of these nave arches are cut away for small columns, as in the cathedral of Avignon, with capitals surmounted by square blocks, the fragment of an entablature. The arches between the nave and aisles are pointed, except in the fifth bay, where they are round. A small round-topped window of the eighteenth century in each bay forms a clearstory and lights this solemn and majestic interior, whose fine proportions and beautiful effect does not need enriching ornament to give it grace and interest.


Transverse Section.

The aisles are narrow, with a loftiness that adds to the apparent restriction of their width. Double round arches resting on plain piers, with small moulded capitals and without bases, as the main piers, divide the bays. Chapels, that, at various times, have been added to the aisles, destroy the original character of this part of the church, which has no longitudinal or wall arches usual in this type. Beyond the fifth bay of the nave is the crossing with a dome of the Provençal form, encased in the tower, which is one of the most striking central features of any Provençal church.

The pointed double arches that enclose the crossing are much lower than those of the nave, but as seen from the western end the nave appears to be closed by a low arch with a wall above it. The nave vault ends against this wall on a single arch, supported by a pier as before, but whose upper part is cut in half with a small outer column, completing the resemblance to the double piers. This construction has suggested the idea that the crossing bay is a survival of an earlier church, which could not be removed on account of the weight of the tower. But there is no reason to date the tower earlier than the nave, and so lofty a structure on the crossing is without precedent in earlier buildings in Provence. On the contrary, this lowering of the crossing arches is characteristic of many Provençal churches, and may be seen in the cathedrals of Vaison, Sisteron and S. Paul Trois Châteaux, though in none of these is it so marked as in S. Trophime. It should be remembered, further, that the nave of this cathedral has the highest Romanesque vault in the south, and its builders may well have hesitated, when they determined upon a tower, to carry its weight on arches as lofty as those of the nave.

Within, the crossing has the usual small pendentives, the wall between them and on them inclining forward to form a circle, which is merged into a very flat dome without the intervention of a string course. The west, north and south walls of the transepts belong to the Romanesque cathedral, but they have been so much modified internally that scarcely more than their pointed tunnel vaults, at right angles to the nave, remain to show their original form. Nothing now is left of the ancient eastern part of the cathedral.

III.

The centre of the west front is filled by the famous portal, one of the most splendid monuments in the south of France, and one of the finest portals of the middle ages. This superb structure is applied to a wall otherwise barren of ornament, and offering a striking contrast to its rich and elegant detail. The outline of the façade tells the story of its internal structure. In the centre is the nave wall, utterly plain, with a low gable having a narrow cornice of dentiles, whose intervening spaces are filled with carved designs. This cornice has a short horizontal member returned at each side. The clearstory end of the wall is flanked with shallow buttresses, continuous with it, and in the centre is a modern round arched window, with a rectangular one beneath it.[*] Below, on each side, is the sloping roof of the aisles, with similar cornices. The upper part of the façade wall is built of larger stones than the lower, and is partly covered with plaster.

In the lower part of this simple wall is the porch, which is slightly wider than the nave. On each side is a small and ugly doorway built in the seventeenth century, and above, lighting the aisle, a round headed window. All this plainness helps to bring out the splendor of the central portal, which is so grand and beautiful as to have the effect of being placed against the church, rather than an integral part of it. But we need not quarrel with such a detail in the majestic effect of this gigantic work.

The portal is formed of a broad arch, pointed, yet so near the half circle as scarcely to be visible in the outer arches save in the geometric elevation. The under surface is decorated with a double row of angels—the upper part of the body only—representing the heavenly host in the scheme of the Last Judgment, which is the theme of the sculptures. Outwardly the arch is extended in a series of finely moulded rolls and hollows, with an outer fillet decorated on its inner surface by a band of foliage. This series of arches is carried on a rich substructure, whose inner wall is treated with pilasters with statues between them, while without, and extended beyond the arch to the ends of the porch, is a short colonnade of three columns on each side, whose bases stand on richly carved pedestals, which, in their turn, stand on a high plain base with mouldings and decorated bands. Below are the steps stretching across the whole front. Above the arch is a flat gable, with a cornice resting on large carved corbels, among which we see symbols of the Evangelists, the Lion, the Ox, the Eagle, and the Angel, while other animal heads and large acanthus leaves complete the series.

The structure of the portal is superb in its simple and direct design, but its rich sculptures make it incomparably splendid. The theme is the Last Judgment, a favorite subject for the doorways of the Romanesque and Gothic cathedrals, and the most southerly completed one in France. In its latest form, in the north, this terrific scene was confined to the tympanum; here it is spread over the whole portal, and is presented on a scale of unparalleled magnificence. In the centre of the tympanum is a majestic figure of Our Lord, seated on a throne in a mandorla. His right arm is raised in benediction, while the left grasps the Volumn or book. Around Him are the symbols of the Evangelists, the Lion and Ox below, the Angel and the Eagle above. All hold books, save the Eagle, below which hangs a scroll. These figures are not confined to the actual area of the tympanum, but project beyond it, partly cutting into the mouldings of the surrounding arch,

---

[*] Chapuy's drawing, made in 1829, shows only the round head of the upper window. The apex of the gable is surmounted by a high, slender, pointed arch with a gable. The west end of the south aisle wall is pieced out straight to the adjoining houses, from which rise a small flying buttress behind the end wall buttress. All these unimportant additions were removed in the restoration of the cathedral by M. Revoil, who gave it, as far as possible, its primitive form.

S. TROPHIME, ARLES, NORTHWEST ANGLE PIER WEST GALLERY OF CLOISTER.

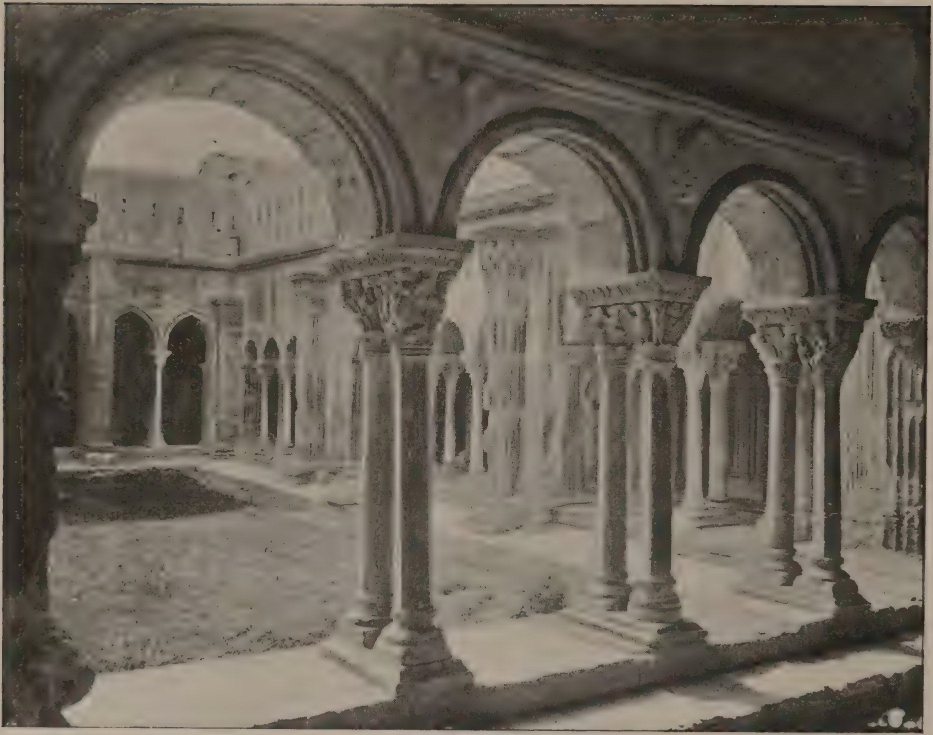
which is decorated with a very rich series of Roman detail, the outermost being a Greek fret.

Below is a frieze, carried wholly around the porch from one end of the nave wall to the other. In the centre, under the tympanum, are the Twelve Apostles, seated on a bench, and notwithstanding their somewhat formal attitudes, characterized by considerable individuality and movement. Each holds a volume of the scriptures, but the formality of their arrangement is relieved by the different gestures and inclinations of the heads, which is intensified by the fact that while most of them are conversing with each other in groups of two, an odd figure, occasioned by making the two central ones face each other, forms part of a group of three on each side,which, moreover, are not placed symmetrically. The sculptor had, therefore, advanced considerably beyond that formal arrangement which is to be seen in many early sculptures.

Taking now the events represented in the frieze in their regular order, beginning at the extreme left of the spectator, as he stands facing it, we have, first of all, on the return end at the beginning, the Temptation of Adam and Eve. Then, immediately on the outer face, begins the procession of the Just; first women standing facing the spectator, then a body of men, clothed in identical and somewhat formal garments, and looking towards the centre of the porch. They are continued around the return at the centre, where they are headed by two crowned personages. Beyond, and on the inward return, is an angel handing a soul, represented, as usual, by a small child, to the first of three seated figures, Abraham, Isaac, and Jacob. Each holds two souls in his lap, and below their feet are small figures rising from the grave. Then come the Apostles, with a seated and majestic figure gazing earnestly towards them at their right.

On the inner return at our right is a standing angel (S. Raphael?) with a sword, guarding the gates of Paradise, and shutting out the souls in purgatory beyond it, among which are a couple of bishops. Then come the condemned in hell, naked and bound with a cord, with flames of fire at their feet. They move towards the right and fill the position corresponding to that of the procession of the Just on the opposite side. On the further return is hell itself, crowded with souls in torment, already partly consumed by huge flames. The theme, to complete the conception of the artists of the Middle Ages, is finished by two panels on the lower faces of the ends of the porch. On the left, at the beginning, is a gigantic angel weighing the souls of the departed, and on the right a huge demon, grasping two souls, with another before him, with a band of fire below. Save for these two panels, which are detached from the upper part of the scene, though doubtless with the intention of emphasizing their importance, and impressing the terror of the one and the horror of the other, this is one of the most detailed, as it is one of the most elaborate representations of the Last Judgment produced in the Middle Ages. It is thoroughly symmetrical and architectural in fulfilling its role as a sculptured decoration, yet it is distributed over a broad surface that might at first glance seem unsusceptible to such organized and harmonious treatment. Every part of the terrible story is illustrated with utmost distinctness, and the spectator has but to look upon it to understand its meaning and realize its teachings. The sculptures throughout exhibit very considerable variety and individuality; every part is sufficiently varied to give relief and change, yet the whole is entirely natural and unforced. The freedom with which the sculptor has handled his work is well illustrated in the liberties he has taken with the space at his disposal. We have already seen an instance of this in the disposition of the symbols of the Evangelists in the tympanum; not less noteworthy is the fact that the figures in the frieze all slightly exceed the space allowed by the architectural lines, the heads rising against the lower mouldings of the cornice, which is surmounted by a band of acanthus.

The sculptures of the lower portions of the porch are not directly concerned with the subject of the Last Judgment, but each group and statue, each image and almost every bit of decoration has a meaning that raises it above mere decoration, and makes it an integral part of a highly developed scheme of sacred symbolism. The carved pedestals of the columns illustrate in picture and in symbol humanity under the law of Moses. A man, half-clothed with the skin of a beast and holding a crook, represents the first industry of mankind. His lost immortality is indicated by an ox's skull. Scarcely has he entered into life than he meets with vices, figured in the adjoining base by a group of hideous fantastic monsters. A lion's head on the next base seems to be decorative only, and introduced for symmetry between the parable of man's vices and the representation of his feebleness portrayed in the story of Samson and Dalila on the last base. On the other side of the doorway the first base shows Daniel in the lion's den and his succor by the prophet Habakuk, suggesting a contrast with the story of Samson that could not have been otherwise than evident to the contemporaries of these sculptures. A lion's head comes next, and the third column has a group of animals in combat, expressing the disorders of humanity before the coming of the Redeemer. On the return at the right are two signs of the Zodiac, the Archer and the Lion, the latter doubtless being chosen because the lion is the symbol of Arles, both indicative of the march of time. The modern traveller may see in these bases only grotesque decorations, now greatly injured by time. But they were more than this, for even the fighting animals expressed an abstract idea, and their value in the scheme of the portal is not



S. TROPHIME, ARLES, THE CLOISTER.

less notable because of their small size and relatively unimportant position.

The columns which stand on these bases are short graceful shafts with charming capitals. The outer of each group are Corinthian-like in form, and of two types, while the central ones have enwreathed foliage. Behind them, on the walls, is a series of panels, separated by richly carved bands, enclosing a large statue. The two end panels, we have already seen, form a portion of the scheme of the Last Judgment. The others contain, counting from the left, S. Peter, S. John, S. Trophime, S. James Minor, and S. Bartholomew or S. Thomas; on the right of the door are S. Paul, S. Andrew, the Stoning of S. Stephen, S. James Major and S. Philip. The church having been originally dedicated to S. Stephen, his martyrdom has a proper place on its portal, and the statue of S. Trophime is given a conspicuous position for obvious reasons. Each Apostle, save S. Paul, who carries a phylactery, holds a book inscribed with his name and a short inscription. The innermost pair of statues on each side are within the arch, and stand facing each other. Below them, as pedestals, are huge animals typifying the heresies they have trodden under foot. It has been suggested that these statues, which are distinguished by remarkable feeling of life and action, and which are carved with scrupulous attention to detail, are later than the other part of the portal, since they are slightly too large for the spaces they occupy. But this is a characteristic of every part, the sculptures of the tympanum and of the friezes extending beyond their architectural limits also. There would appear, therefore, no room for such an opinion on such grounds.

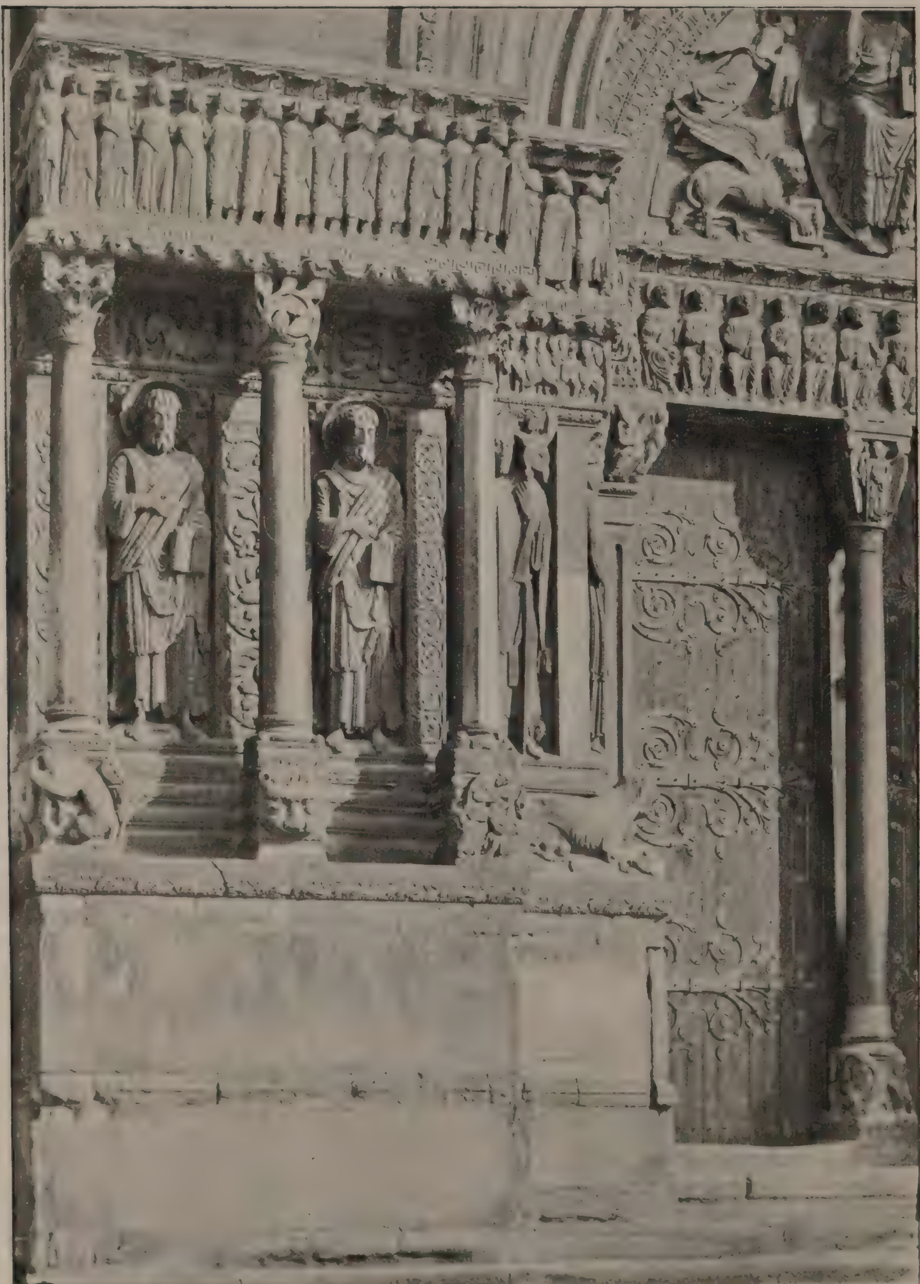
Above the statues, and below the upper frieze in which the details of the Last Judgment are shown, is a smaller frieze, the height of the capitals of the columns. A variety of subjects are represented in it, in a mediocre manner and with that disregard to chronology the mediaeval artist was frequently guilty of. The scenes chosen are the Dream of Jacob—more likely the Dream of Joseph—the Annunciation, the Nativity, the Angels announcing the good news to the Shepherds, the Presentation in the Temple, the Purification, the story of the Magi, the Massacre of the Innocents, and the Flight into Egypt, ending with a strange collection of animals on the right.

The capitals of the piers at each side of the doorway and the capital and base of the delicate slender shaft that divides it in two are also decorated with symbolic sculpture that should not be overlooked in considering the full effect of this majestic portal.

This great work of art fascinates and delights one by the splendor of its composition, the varied imagination of the artist, the subtlety of its allegory, its superb plastic qualities, its decorative value, and the refinement of its execution. It is the work of no ordinary artist, but of a master of the first rank, who here made the work both architectural and sculptural, combining the two arts in the happiest manner. The effect is astonishingly rich and splendid, yet there is no overloading and no crowding. The great statues of the Apostles have ample room for their dignified personalities; the processions of the Elect and the Condemned move in stately symmetrical lines. A great lesson in Christian doctrine is taught in this portal; its stones, its statues, its animals, even, are alive with meaning and with truth. Yet the lesson it teaches, the truth it emphasizes, the structural work it accomplishes, is done in so orderly and sober a manner that one scarcely realizes how varied are its parts until it has been carefully and minutely studied. And if the theme and scheme are great, so also is the plastic skill with which it has been carried out. The utmost variety in expression and in attitude characterizes its numberless statues, though within rather narrow limits. Perfect freedom in handling the chisel is not, indeed, to be found here, but great strides are made towards it. The detail of the architectural mouldings, too, is rich, symmetrically patterned, and varied.

Not the least important problem suggested by this portal is its origin. The combination of sculpture and of detail is almost without parallel. The detail is extremely rich and very Roman in character; the sculpture, in theme and application, suggests the usage of northern France, rather than the sparsely decorated churches of the south. Arles is rich in Roman monuments, and the sculptor of the portal need not have gone beyond the city for his models for architectural ornament. But nowhere in Provence are the Roman models so richly used or more abundantly employed. Obviously,only an artist who was familiar with other forms of decoration than those of Provence could have carried out such a work. Further than this it is not possible to go without indulging in pure speculation. M. Viollet-le-Duc has attributed the detail to Romano-Greek-Syriac origin, and the sculpture to northern France; but he does not explain how these influences came to be joined in this one work.

There is but one other portal in France that directly approaches that of S. Trophime, and that is the portal of the neighboring church of S. Gilles in Languedoc. It is larger, having three doorways instead of one, but neither in execution nor in idea does it equal the splendid composition at Arles. The arches are round, but the general idea is much the same as in S. Trophime. The sculptures illustrate the life of Christ, and are thus more varied than those of the other church which are chiefly concerned with a single subject. The portal of S. Gilles is probably the earlier; the great statues in the main wall are more archaic in their attitudes and costume, and the Corinthian motif appears in most of the capitals. At S. Trophime

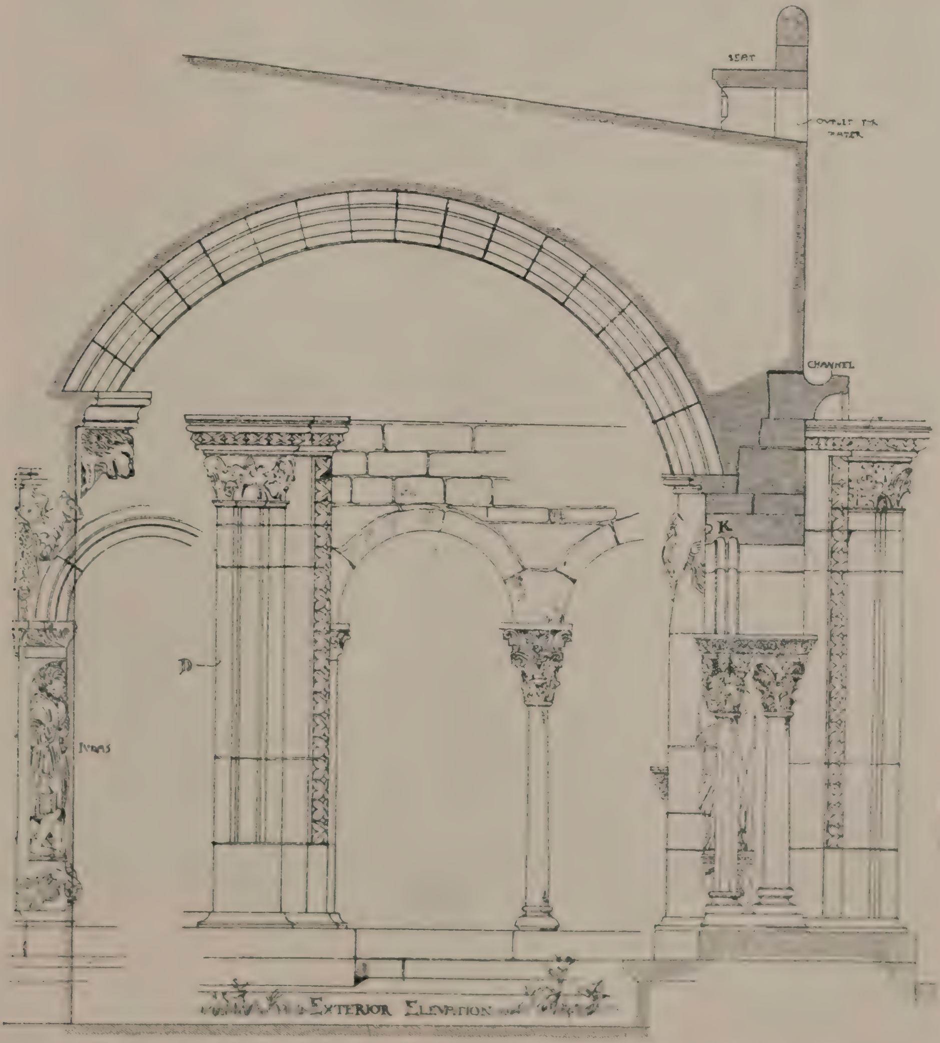


S. TROPHIME, ARLES, DETAIL OF WEST DOORWAY.

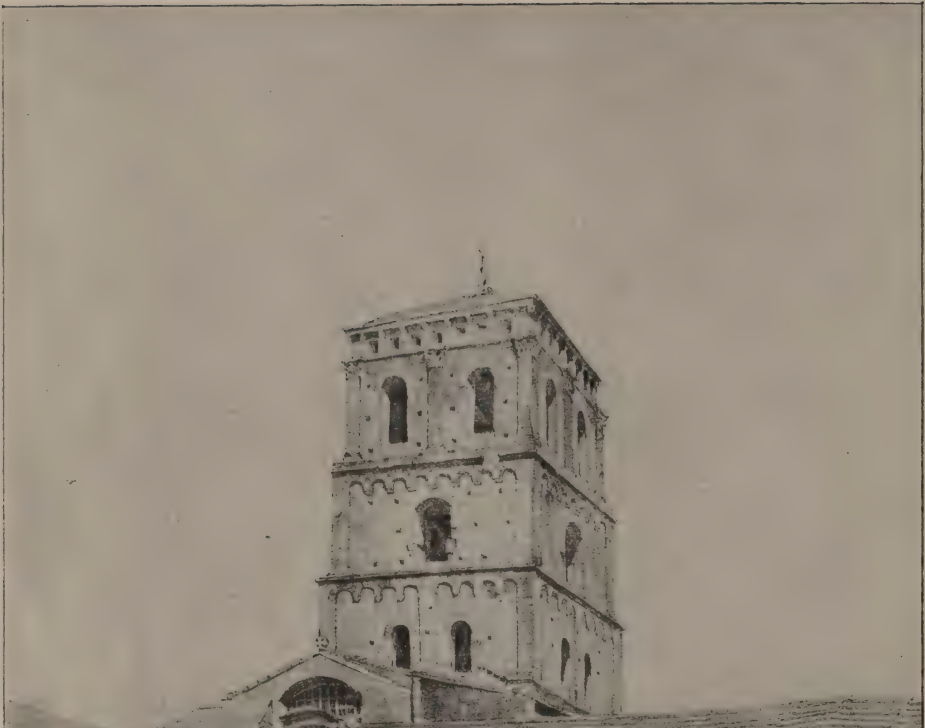
the detail, though more Roman, is worked with greater care, and the sculptures show an advance in every particular. At most, however, only a short period of time can separate these two works, both of which evidently belong to the twelfth century.

IV.

Quite as splendid, and as well known as its portal, is the cloister of S. Trophime, which is reached by a flight of steps in a narrow passage beyond the south transept. It is a slightly irregular rectangle, whose north and east walls date from the twelfth century; the west was transformed in 1389, and the south was given its present aspect in the sixteenth century. The older parts justly rank among the most interesting monuments of their kind in France. The arcades consist of three wide bays, separated by piers, and each containing four small round arches on coupled columns, both piers and columns standing on a broad continuous base. The walks are covered with a rounded tunnel vault, that is stopped on the enclosing walls at a

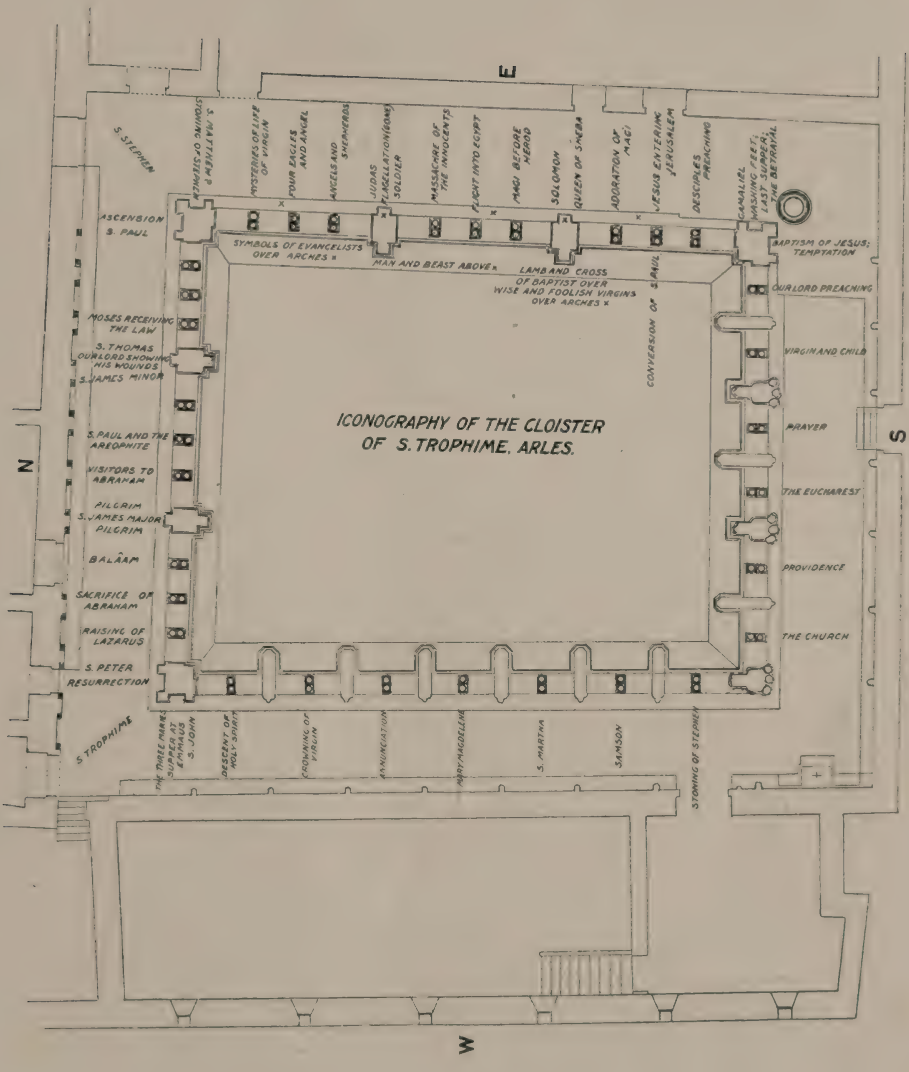


SECTION AND ELEVATION OF CLOISTER, S. TROPHIME, ARLES—EAST GALLERY.
Drawn by Arthur Needham Wilson. From *The Builder*.



BOSTON PUBLIC LIBRARY.

S. TROPHIME, ARLES.—THE CLOISTERS FROM THE QUADRANGLE.
(From *The Builder*.)



ICONOGRAPHY OF THE CLOISTER OF S. TROPHIME, ARLES.

higher level than its origin over the arcades,giving an elliptical or segmental section. The arches which sustain this vault rise, on the arcade side, from a projection applied to the piers between the bays, while on the enclosing walls they rest on large corbels, grotesques and animals, with small cornices of acanthus leaves that are a continuation of a plain string at the origin of the vault. A single rib runs diagonally across the junction of the vaults at the corners.

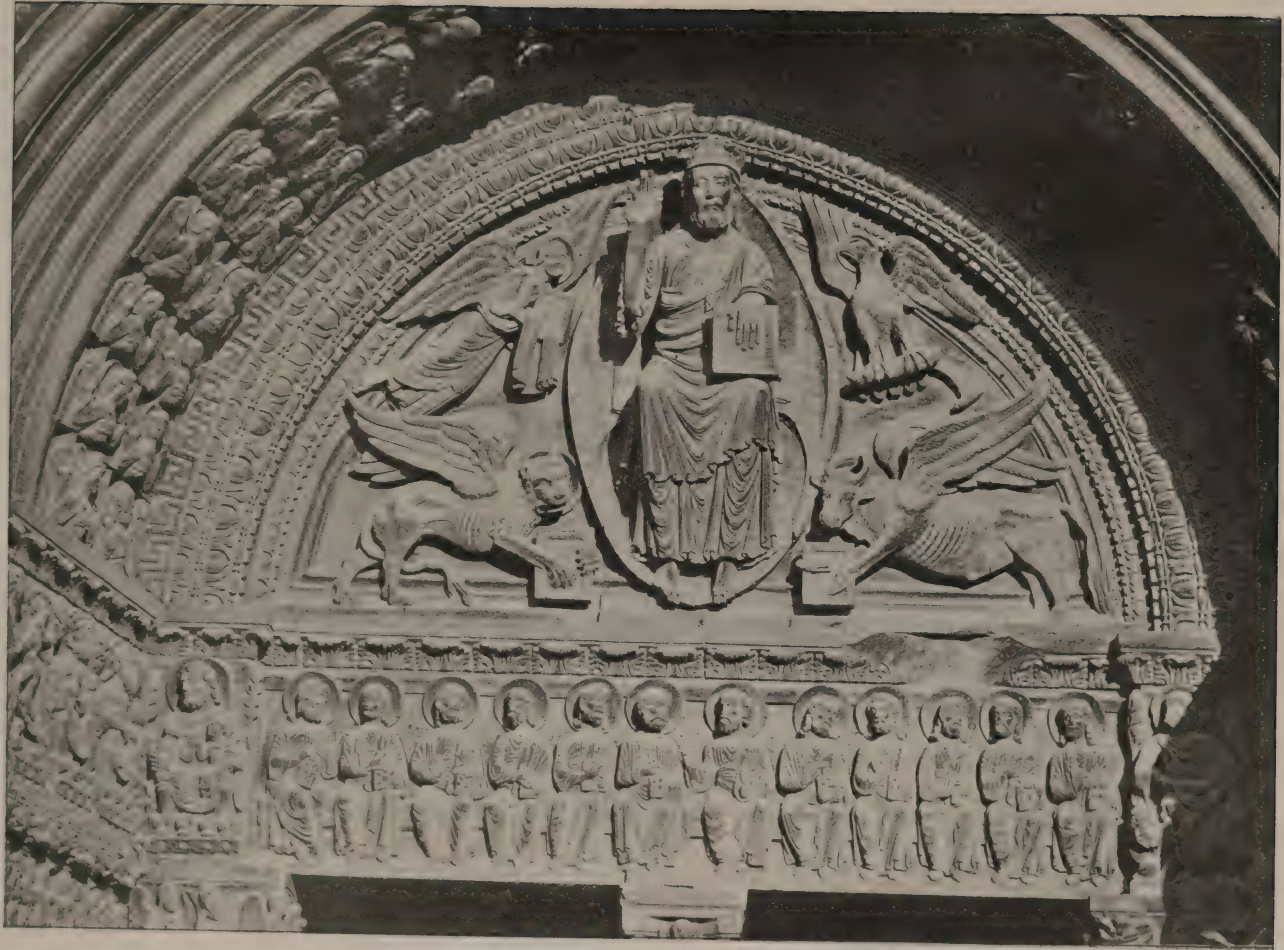
The sculptured decorations of these two galleries are amazingly rich, and rank with those of the portal in their iconographic value. In the north walk the arcade arches are plain and unornamented; in the east walk they are wider, higher and lighter, with simple mouldings on their inner edges; obviously of a slightly later date.

The angle piers are complicated pieces of masonry elaborately decorated with sculpture and with detail. The main portion of each face towards the walks is decorated with sculptured panels, containing one or more reliefs, while large statues on the three inner corners emphasize these important points. The piers between the bays of the arcades in the north and east galleries are somewhat similar to the corner piers, but less monumental in design. The central part, which carries the vault arch, has a statue on a high pedestal, while the pilaster which should support the adjoining arch of the arcade is cut away for a statue standing on a low base. In the east walls the piers are similar, but the central statues have disappeared. Over one of the piers is a relief of a man in armor battling with a gigantic beast; over the other is the Lamb and the Cross of the Baptist inscribed in a circle; in the tympanum of the arches is a series of greatly defaced figures, representing the Wise and Foolish Virgins.

Interesting and varied as are the sculptured figures the greatest beauty of these galleries is in the capitals of the columns. The shafts are short and delicate, and round or octagonal. The capitals are large, superbly carved with an almost bewildering power of imagination, and each pair, as is usual with work of this date, is cut from a single block, with an abacus, which, in most instances, is also splendidly decorated with foliage or with wreaths. The capitals are foliated or decorated with scenes and figures. The former show the Corinthian motif, and are beautiful and rich examples of a considerably altered type that still distinctly recalls the original. The pictorial capitals illustrate an immense variety of themes, by both figures and groups. A good many of them are in a greatly defaced condition, but in all of them the scenes represented are graphically shown with directness of expression and very considerable dramatic skill.

Of the enclosing walls of these two walks that of the eastern scarcely calls for mention. It is entirely featureless save for several unimportant openings, and a Renaissance door opposite the end of the north walk. The corbels of the vault arches are similar to those in the north walk, but with decorated abaci. The north wall contains, next to the featureless archway from the cathedral, three of the original bays of the enclosing wall, consisting of arches on columns with chanelled piers between them. They are a good deal restored.

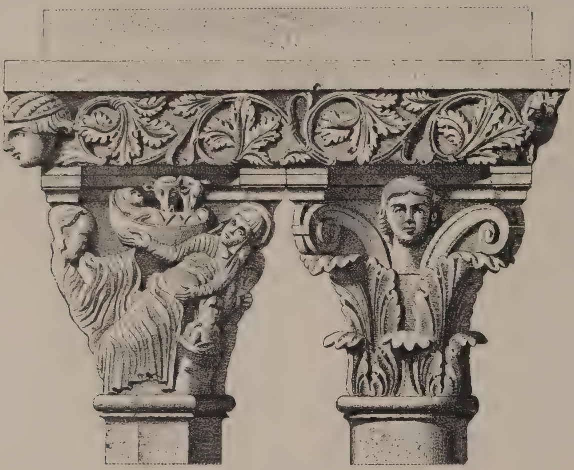
The rebuilding of the remaining galleries was begun in the south walk in 1389, by Archbishop François de Conzié. The main piers have pedestals and niches for statues, all now disappeared, the statues having been cut from separate blocks, instead of, as in the older walks, forming part of the structure; the space between these piers is divided by a thinner pier, making six bays in all. Each contains two pointed arches, with coupled columns in the centre, and their outer edges continued as a columnette on the face of the pier, where it forms part of the bundle of columnettes which carry the cross vaults of the passage. The small foliated capitals of the columnettes of the vaults belong to the style of the



S. TROPHIME, ARLES—SCULPTURE OVER WEST DOORWAY.

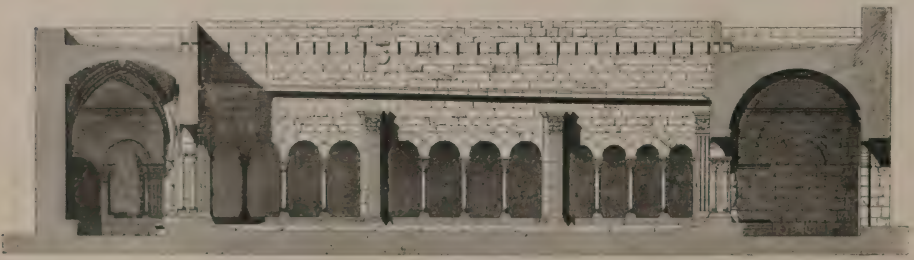
BOSTON PUBLIC LIBRARY.

walk; those of the intervening columns, however, recall those of the previous walks, though distinctly later in style. The inner series of capitals are pictorial, the subjects being taken from the ecclesiastical history of the first century, instead of representing scenes from the bible as in the earlier walks. The capitals of the outer columns are foliated or consist of a symbol of an Evangelist. The columns are all round and more slender than before, and the arches have mouldings on both edges. The enclosing wall is decorated with arches like those of the arcade, with bundles of applied columnettes, whose capitals are foliated towards the east, and have small groups towards the west. At the southeast angle of this gallery is a large well-head, with a fine strong coping; on the angle pier just above it is a holy-water font.


CAPITALS IN THE CLOISTER.

The western gallery closely resembles the south. It contains seven bays, each with a pair of pointed arches, but the piers are all of the same size, and similar to the smaller piers of the south walk, though the columnettes are more slender. The arrangement of the capitals is the same, but the subjects of the pictorial ones are considerably varied, including both legendary and scriptural themes.

The rich sculptured decoration of the walks is not reproduced in the ornamentation of the quadrangle; the walks were in constant use, and there the storied capitals and suggestive sculpture had natural and necessary place. The exterior capitals of the ar-


SECTION OF THE CLOISTER.

cades are scarcely less rich, in their superbly varied foliage, than the inner pictorial ones, but it is interesting to note, as an evidence of the appreciation of the situation by the designers of the cloister, that with but one or two exceptions all the outer, or more distant capitals, are foliated. On the north, piers between the bays are strengthened externally by square channelled pilasters, with Corinthian-like capitals. The original piers on the east have disappeared, and in their place are fine Gothic piers, with the central face treated as three applied columnettes, with a dog-tooth ornament on the pier behind. On the south the larger piers have small plain pilasters towards the quadrangle, without capitals. The west walk is supported by buttresses, whose edges are treated as small columnettes. None of these piers, buttresses or pilasters support anything, and it is doubtful if the older ones, at least on the north side, ever carried an architectural member. A short distance above the pilasters and running around the quadrangle, is a small hollowed ledge; it is the gutter built at the period of the older walks. In the thirteenth century the slope of the roof, which then descended over the vaults at a rather sharp angle to this gutter, was raised and supported on a high piece of wall above it. The new roof is only slightly inclined, and forms an open walk above the lower arcade. A bench and coping were built at the outer edge, and under the seats a series of narrow slits were cut that permitted the water to fall down into the original gutter.

From the cloister is obtained the best view of the great central tower. Though one of the highest structures in Arles—138 feet—its considerable size is dwarfed by the immensity of the church, and its location over the crossing deprives it of the value it would have had as a dominating feature in the façade. It is square, rising in three stages, and surmounted by a low upper story or attic. Each stage is slightly recessed behind the other, and all are treated with considerable severity and uniformity. The first is divided in the centre by a flat pilaster, connected by a cornice of four small arches with a similar pilaster at each end, each bay having a small round arched window close to the central division. The second stage is similar, but without the dividing pilaster in the middle. In the third stage the middle pilaster reappears, all three with Corinthian-like capitals, and a round arched window in the centre of each bay. The attic story has seven small rectangular openings in each face, and is surmounted by a low four-sided pyramid, dating from the early part of the nineteenth century. Apparently the builder of the tower of the cathedral of Avignon, when he rebuilt it in the fifteenth century, found his inspiration in this structure, using the double division of each face and placing his windows close to the central pilaster as in the first stage of S. Trophime.

V.

The historians of the cathedral of Arles have generally been content to rest their labors with the parts of the church we have now seen, dismissing the new choir and other later parts, with a few short sentences. The method is not wholly unjustifiable, since the additions in the fifteenth century enlarged the church at the expense of its beauty and harmony, while further changes in the seventeenth century helped to emphasize the difference between the old and the new without adding beauty or grandeur. From the point of view of the art historian there is, therefore, little more to be said, but an historian of the cathedrals of France cannot thus lightly dismiss his building when he reaches a part that does not interest him. He must take the cathedrals as they have come down through the centuries and it is necessary, therefore, to briefly glance at the later additions to our church.

The choir of S. Trophime is really a Gothic church of the fifteenth century applied to the nave of the twelfth. It is considerably wider, both in the sanctuary and its aisles, than the preceding parts, though but three bays deep. The piers are semicircular towards the choir with corbels supporting the upper parts of the transverse arches of the vaults and the diagonal and longitudinal ribs. Deeply moulded arches continued in a band without capitals to the floor open between the piers into the ambulatory. There is no triforium, and the clearstory is formed of a large two-light window, now blocked up. The three bays at the east are similar, but the ribs and arches of the vault are applied to the piers without corbels.

The ambulatory of the choir is very irregular. It was apparently intended to erect a polygon of seven sides, but if we count by the vaults it has thirteen bays, two of which are half bays caused by the irregularity of the plan, and if we count by chapels we have eight bays, the first on the north containing two small chapels. In no sense is this a chevet; the chapels are of various shapes and sizes; their vaults are different; the piers between them, their entrance arches, and even the vaults of the ambulatory exhibit variations and differences in size, direction and in form it would be tedious to enumerate. The difference in date which this irregular construction implies is not sufficiently marked, nor of enough importance to warrant extended study. Even the nave did not escape the petty improvements of which the choir is such a distressing example. Two small late Gothic chapels, each different in design, are opened out from the third and fourth bays of the north aisle. In the south aisle is a large chapel entered from the fourth bay, and extending two bays to the eastward.

The additions of the seventeenth century are chiefly apparent in the transepts, and thus, though doubtless by accident only, the various epochs of the interior are well separated from each other. The operations carried on at this time did, indeed, extend much further, and included many "restorations" and defacements in the nave, all of which have been happily removed by M. Révoil in his restoration.

Each transept has in its outer wall a large monumental doorway, with Ionic pilasters, an entablature and a pediment with a cartouche in the centre. Above is an elliptical tribune supported by an elliptical vault over the doorway, and a large segmental-topped window with an ornamented frame. On the south side the door leads to the sacristy, on the north to a large square chapel with a pointed cross vault.

In the corner of the west wall of the north transept, close to the aisle of the nave, is a small door, by which we may, if we choose, leave the cathedral. It leads to a narrow passage, with a flight of steps, opening onto a small court, surrounded by houses. Under one of these is an archway to the street. Here we may end our visit, but it is better and pleasanter to return to the south transept, pass once more into the wonderful cloister, and thence to the street, not forgetting, in ending our visit, to look again upon the great west portal, whose majestic statues have looked down upon seven centuries of peoples.

Barr Ferree.

PANEL FROM THE CLOISTER.—S. TROPHIME, ARLES.

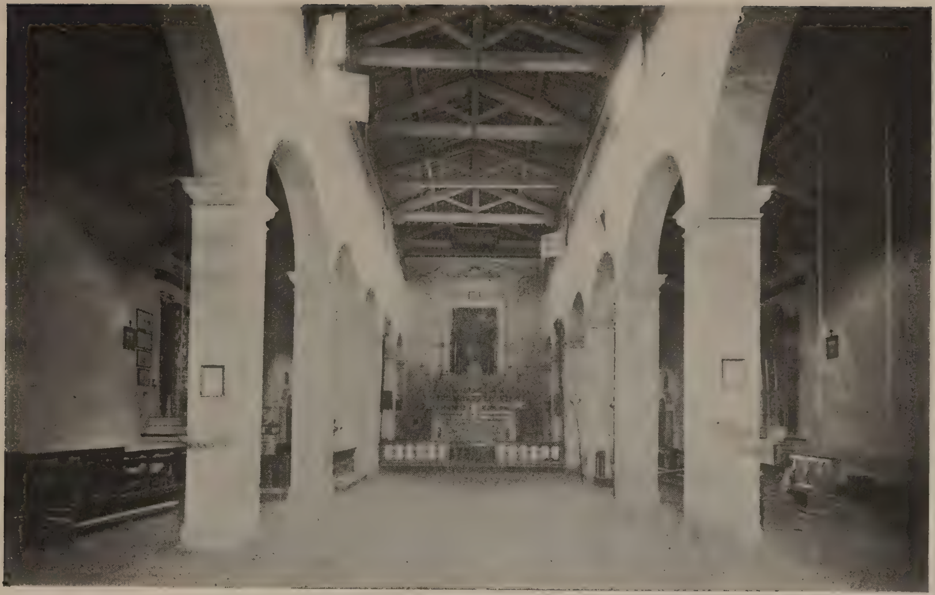


FIG. 4.—INTERIOR OF SAN STEFANO (OUTSIDE THE WALLS) AT PISA.
Photographed to discount the perspective illusion. Compare Fig. 5 Brooklyn Institute Survey.

PERSPECTIVE ILLUSIONS IN MEDIEVAL ITALIAN CHURCHES.

IT is now twenty-six years ago since I made (in 1870) my first observations of a hitherto neglected class of phenomena in the medieval churches of Italy. These observations were limited in extent, but were revolutionary in scope and in suggestion, or suggestiveness. Although they were almost wholly confined to the Cathedral of Pisa, and other churches in the same city, the implied results were very far-reaching in their antagonism to current views of medieval building. It was impossible to assume that certain phenomena had developed and disappeared in this single town. It was certain that they had historic origin before the time of the given buildings and historic continuation subsequent to their period, and certain that there must be affiliated phenomena in other localities. On the other hand it was clear that the phenomena were not universal and it appeared doubtful that they could be widespread. Otherwise it seemed to me that their discovery could not have been left to me to announce. This dubious condition of my own knowledge on the subject prevailed down to last year, when I was enabled by the co-operation of the Brooklyn Institute of Arts and Sciences to make an examination of a very systematic character for the whole of Italy, lasting over five months, and assisted by an able architectural expert and surveyor.* Most of the photographs used in illustration were made by him with all the precautions to insure accuracy which are known to photographic science and the surveys shown are also his work.

Before the present year I had made only one publication on the subject, which was confined to Pisa, and which appear in Scribner's Magazine for August, 1874, under the title of "A Lost Art."

In the arrangement of illustrative matter I shall combine the observations of 1870 with those of 1895, making a pivot of the buildings in Pisa for various classes of phenomena, diverging to the corroborations and similar

---

*John W. McKecknie, Esq.

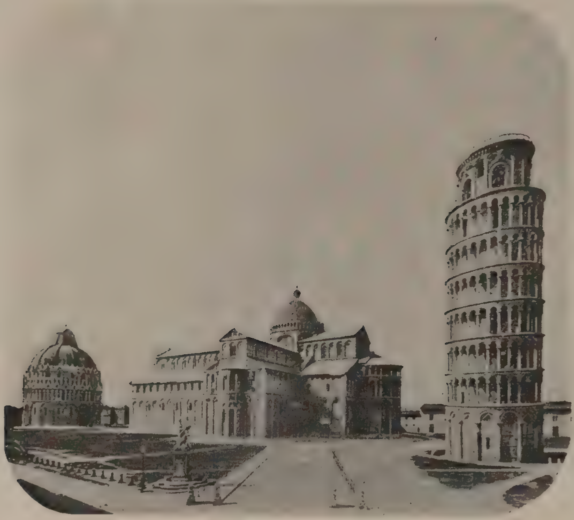


FIG. I.—CATHEDRAL, LEANING TOWER, AND BAPTISTERY AT PISA.

facts now found in various other parts of Italy for the given set of phenomena and then returning to Pisa for the indication of a new series of phenomena.

I shall therefore beg my readers to enter with me the public square in Pisa, which contains its world-famed architectural monuments, just as I first entered it in the month of February, 1870. The Leaning Tower fronts us first. What I have to say in later Papers points to a solution of its mystery, as far as intention is concerned, and also throws some light on the purposes and evolution of this construction. As we all know, the question between accident and intentional construction is one which has been long debated and never settled, so far.

As I entered this Piazza del Duomo near the point from which this picture was taken (Fig. 1) I was struck by an obliquity in the lines of the cathedral which seemed to me to call for an explanation, and perhaps to be related to the inclination of the tower. The central string-course of the side walls is out of horizontal two feet. It slopes downward to that extent between façade and transept; being highest at the façade and lowest at the transept. This obliquity is found on both long sides of the cathedral.* On both sides the string-course of the transepts slopes downward from their outer extremities to meet the downward slope on the side walls. Fig. 2, showing the oblique string-course, is a photograph made for me by Mr. C. F. Cox, of New York, in 1894. It is the first picture ever made for the purpose of showing the obliquity, which is slightly exaggerated by a turning of the camera. (The exact deflection from the horizontal is shown by Fig. 12 in the preceding issue of the Architectural Record.)

On the given occasion I took a walk outside the walls of the city in order to study this obliquity from a distance, and as I came round to the neighborhood of the Lucca Gate and was still outside of the city, I stumbled on the little village church here shown in Fig. 3, the eleventh, or twelfth century Romanesque church of San Stefano. Humble and ugly as it is, it has one feature which allies it to the Leaning Tower, and one which allies it to the sloping cornice. If we consider the Leaning Tower as a freak or eccentricity, rather than an accident, it has a counterpart here in a round arch cor-

---

*Photograph in parallel perspective in the preceding No. of the Magazine, Fig. 12.

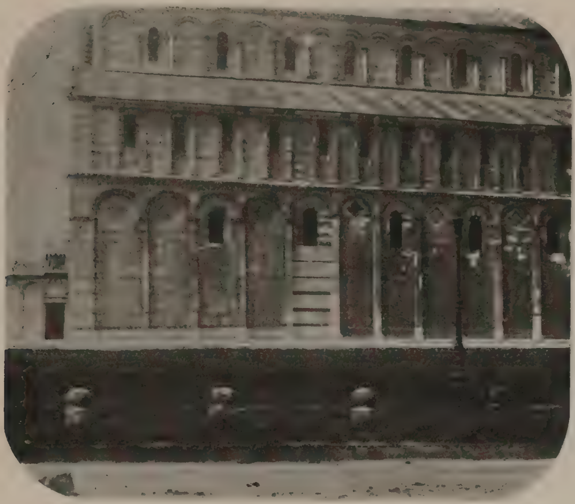


FIG. 2 —OBLIQUE STRING-COURSE OF THE PISA CATHEDRAL.

Photographed for the Author by Mr. C. F. Cox, of New York, in 1894. The first picture ever taken for the purpose of showing an obliquity of construction.

nice with its parts built in diminishing dimensions, so that it disappears in a short series of small projections at one end. If we go inside this little building (as I was led to do by this curious exterior trait) we shall discover the secret of the sloping cornice of the cathedral. Here is the interior, built to represent a sham perspective,on the principle practiced by every theatrical scene painter of the nineteenth century (Figs. 4 and 5). The measures of our survey show that the pier spacings diminish about ten feet in the direction toward the choir. The arches drop about five feet in the same direction. (The capitals also drop, but I omitted to furnish the data to Mr. McKecknie. The section is incorrect in representing the capitals as horizontal.) The pavement slopes up toward the choir six inches. In the eighteenth century the church was entered at the end which now forms the choir, and the widest bay was used for the choir, but this arrangement undoubtedly reversed an earlier one, to which the modern restoration has returned. This appears from an examination of the present façade, which is certainly the original façade of the church.

The optical effect of a trick in modern stage setting which correspond to that seen in San Stefano is represented by the diagram here shown (Fig. 6).

I carried with me in 1870 most of the important German compendiums on the history of art and architecture, and was thus aware that the Middle Ages are not at present credited with having practiced these perspective illusions. Aside from a reference by Fergusson to the Cathedral of Poitiers as having an illusive scheme of perspective, I have not been able in a course of reading which has lasted for twenty-six years to find any references in modern authors to the subject. (The notice in Baedeker appears to be taken from Fergusson.) The cases in Italy are, however, fairly numerous, as shown by my surveys of 1895. In my ultimate publication of details, I shall furnish surveys from over thirty-five Italian churches, showing related phenomena of this class.

We will now return to the oblique string-courses of the cathedral, with

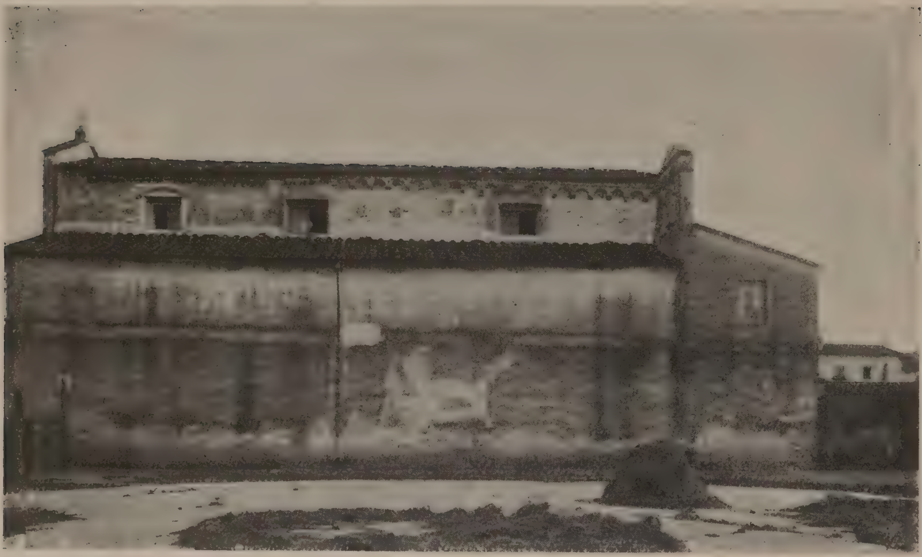


FIG. 3.—SAN STEFANO (OUTSIDE THE WALLS) AT PISA.
From a Photograph by the Brooklyn Institute Survey.

the suggestion obtained from the little church of San Stefano, that they were also intended to produce an optical effect. What this effect is from certain points of view is shown by Fig. 7.

The conclusion that the sloping string-courses of this cathedral were intended to build in perspective effect is reached in the following way: As a matter of fact they do have this result. As a matter of fact we can show similar devices inside the cathedral and inside a great many other churches. The optical effects of direct increase of dimension are, of course, only obtainable from certain points of view. What these effects may be from other points of view I shall consider later. The theory that the cathedral string-courses were sloped without a purpose is to me inconceivable. An explanation, based on the height of the first story of the façade, may be suggested, but will probably not be insisted on when related facts in other buildings have been considered. The measures taken for this slope by our surveys are the first ever made for the given obliquity. The first measures for this phenomenon were taken for me by Mr. C. F. Newton in 1887, through the kind intervention and assistance of Prof. Wm. R. Ware, but no levels were known till those of 1895, taken by Mr. McKecknie. It is a phenomenon which is generally overlooked by visitors to Pisa; as it is discounted into an optical effect. The most remarkable instance of this habitual oversight is furnished by Mr. Ruskin in his "Seven Lamps" (see the "Lamp of Life"). It there appears that in looking directly at this string-course he could not decide whether or no it was out of horizontal.

Before calling attention to an arrangement of arches in the Pisa cathedral interior, which corresponds to that of San Stefano, but which has a much more subtle character, I should like to call attention to related facts, as developed by my surveys of 1895, for a number of other Italian cathedrals and churches.

We shall first take note that the choir of the medieval church is generally the objective point of these illusive arrangements of interiors, as being that part of the building to which the worshipper is turned, and the one which he faces when entering by the main door.

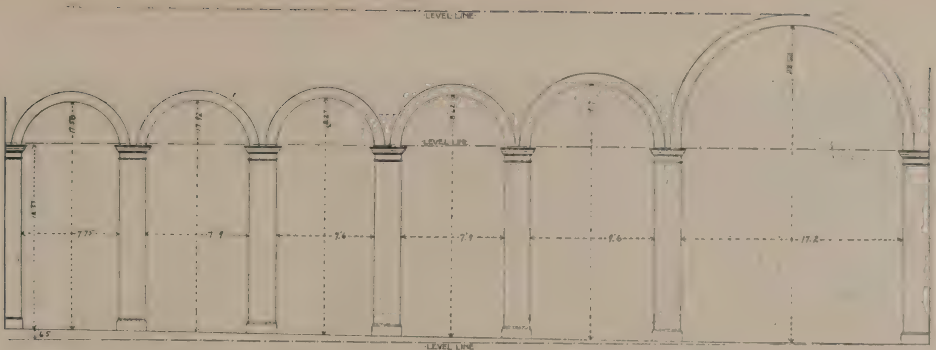


FIG. 5.—SECTION OF SAN STEFANO (OUTSIDE THE WALLS) AT PISA.

The bay assigned to the choir is on the left. Pier spacings diminish 10 ft. and arches drop 5 ft. in the direction toward the choir. Pavement slopes up six inches in the same direction. Compare Fig. 4. Brooklyn Institute Survey.

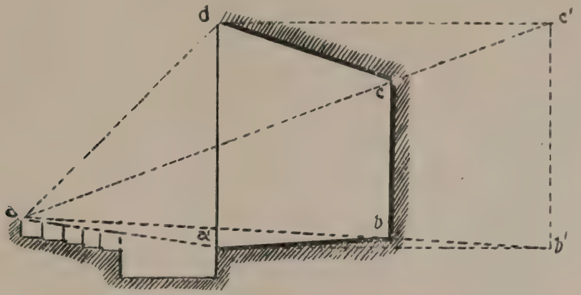


FIG. 6.—DIAGRAM FROM THIERSCH.

Optische Täuschungen auf dem Gebiete der Architectur. (Optical Deceptions in Architecture.) Showing the increase of apparent size obtained by a modern stage setting.

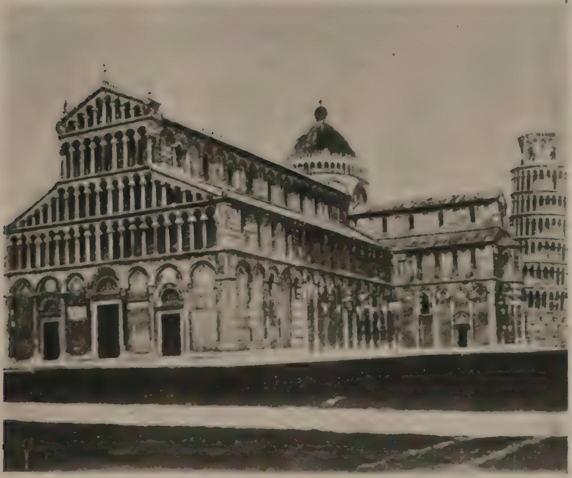


FIG. 7.—PISA CATHEDRAL.

From a point of view which discounts the sloping string-courses (Fig. 2) into perspective effect.

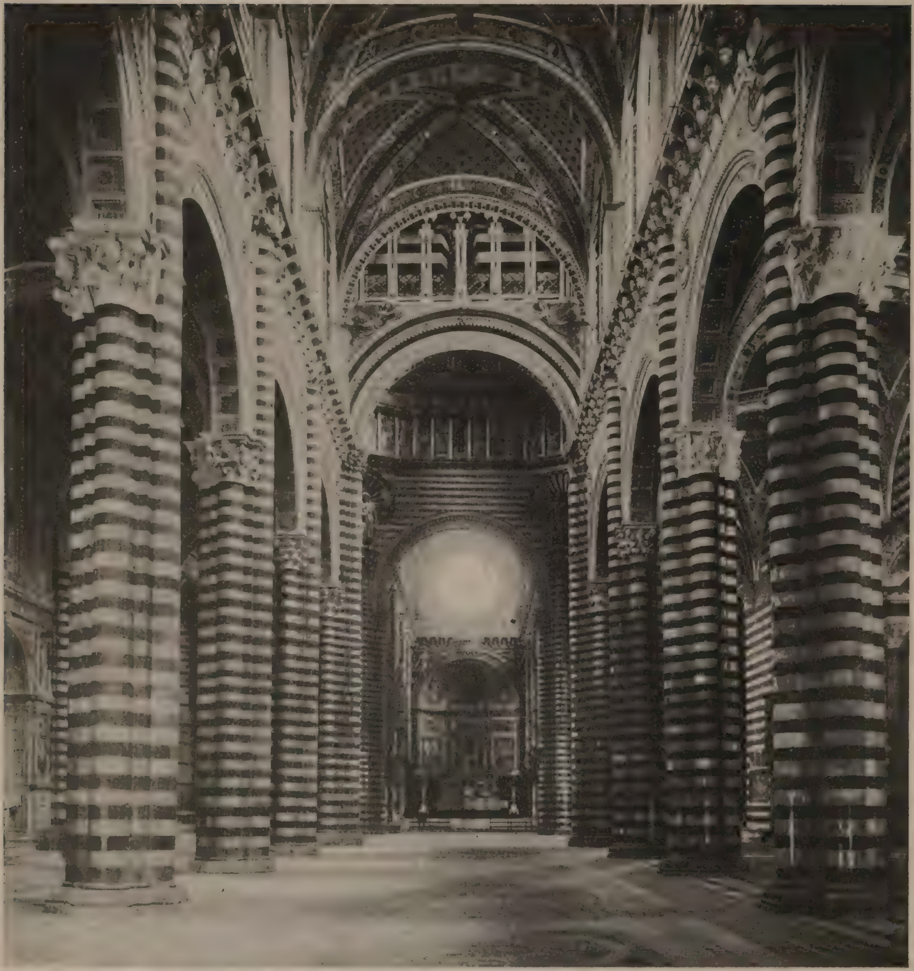


FIG. 8.—SIENA CATHEDRAL.
Showing the arches spanning the nave at the transept and supporting the dome. The further arch drops five feet lower than the near one. Compare Fig. 9. Photographed for the Brooklyn Institute Survey.

In the cathedral at Siena there is a very ingenious device to exaggerate the length of the church, and the distance of the choir. Of the two large arches which span the nave under the dome, the second is five feet lower than the first. The device is only detected by comparing the two arches in question, when one is under the dome, and this can only be done with some difficulty, as suggested by our photograph looking up into the dome. It is impossible to evade the illusion from any standpoint taken in the nave. (Figs. 8 and 9.)

Now what might be considered fortuitous or accidental in one case cannot be so considered when the same facts are found to occur in the same way in a series of buildings; but in the confusion and variety of impressions which overwhelm one in a vast cathedral, a trait like the one specified escapes the attention of the most exact and careful observer. It may be noticed accidentally, but in such a case, unless there is a pre-existing suspicion of a wide diffusion of similar arrangements and of a controlling purpose in all of them, the isolated fact is ignored

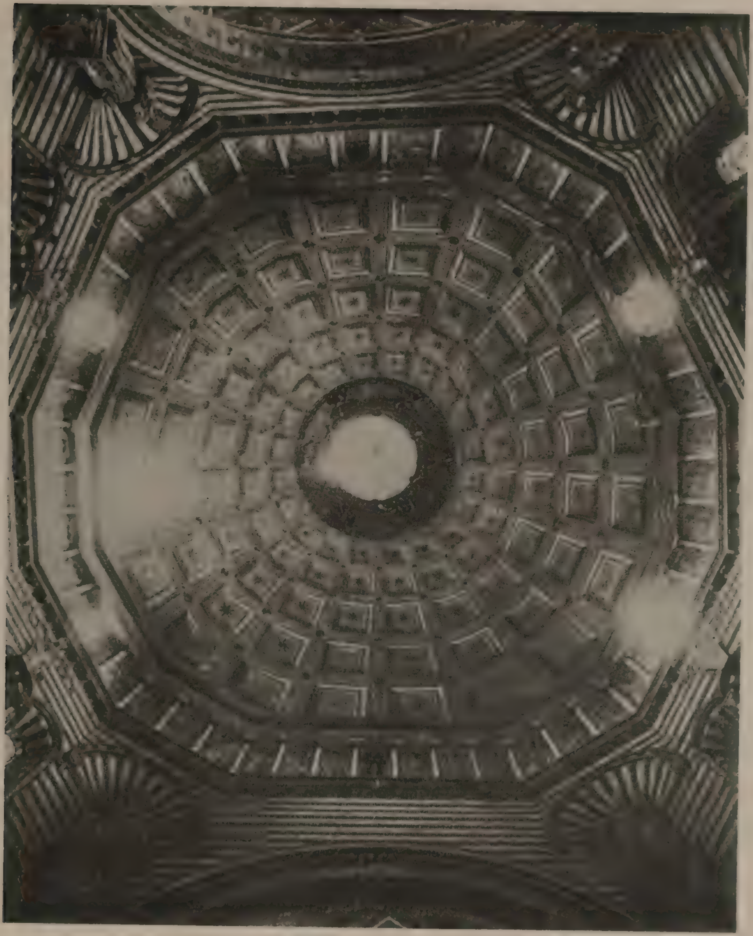


FIG. 9.—THE DOME OF SIENA CATHEDRAL.
Photographed to show the disparity in the height of arches spanning the nave. Compare Fig. 8.
Brooklyn Institute Survey.

and forgotten. What has been lacking to the study of medieval architecture so far has been, first, the suspicion that the phenomena existed, and, second, a systematic search for them. It was my good fortune, at the outset of my own studies, to stumble on a building of such conspicuous and palpable trickery, that the suggestion of the prevalence of a system of such devices was natural. If I had made the rounds of the Italian cathedrals in 1870, as they are made under ordinary circumstances, by other students, and if I had, at the close of such a tour or during its extended progress, entered the church San Stefano in Pisa, I am quite certain that I should have regarded it as an isolated eccentricity, and have paid no further attention to it. So it might possibly be in the case of some other student with the instance of the arches at Siena; but in my own experience Pisa happened, for some curious personal reasons, to be the first Italian town which I had ever visited as a student of medieval architecture. San Stefano happened to be the first church in Italy that I ever entered for purposes of study; for the sloping string-course of the cathedral had so taken possession of my curiosity that I had not yet seen its interior when I entered that little church. San Ste-

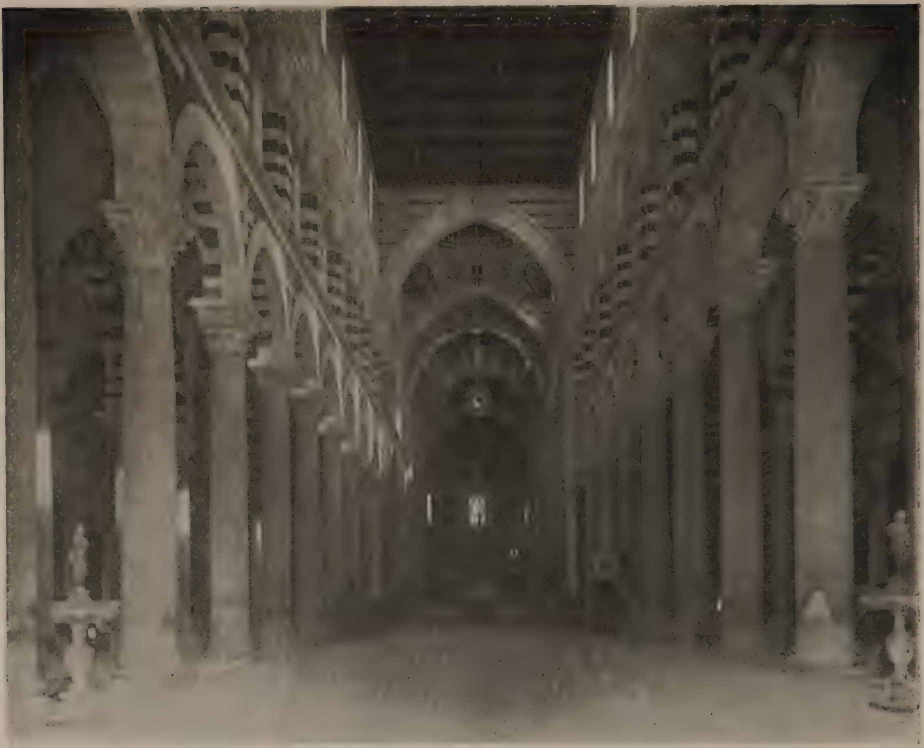


FIG. 10.—PISA CATHEDRAL.

Showing the arches spanning the nave at the transept. The nearer arch is pointed, the farther one is round and drops three feet lower. This view discounts drops in the nave arches of 1.64 (left) and 1.98 (right) (feet and decimals); see gallery levels and sections in the next issue. Photographed for the Brooklyn Institute Survey.

fano gave me a clue. The Pisan churches, and especially the cathedral, turned out to be saturated with similar devices.

Hence, the Brooklyn Institute Survey of 1895, which entered every well-known church in Italy and hundreds of minor churches, with one definite object in view, which was to observe and collect all the facts bearing on one certain question. These facts must be viewed as a whole, and I hope that they may be considered as a whole, after the individual and sequent mention is terminated.

At Siena the perspective illusion is assisted by the treatment of the apse, which is placed wholly below the string-course which elsewhere defines the base of the clerestory. We have thus a line of arches crossing the church, each dropping far below its predecessor. A moment's observation will show the peculiar lowness of the apse, but the effect on the eye remains the same, as regards the impression of distance.

There are four other Italian churches known to me in which this same particular illusion obtains in the use of transverse arches—S. Nicolo at Bari, the cathedral of Piacenza, S. Maria Novella at Florence, and the cathedral of Pisa. The last three cases correspond to that just shown at Siena. Murray's guide-book speaks of two pointed arches as spanning the nave at the transept, but only one is pointed. The second is round and drops at least three feet below. (Fig. 10.) At Piacenza the [illegible] is four feet. In S. Maria Novella [illegible] is about two feet. The arrangement [illegible] S. Nicolo at Bari is shown [illegible]

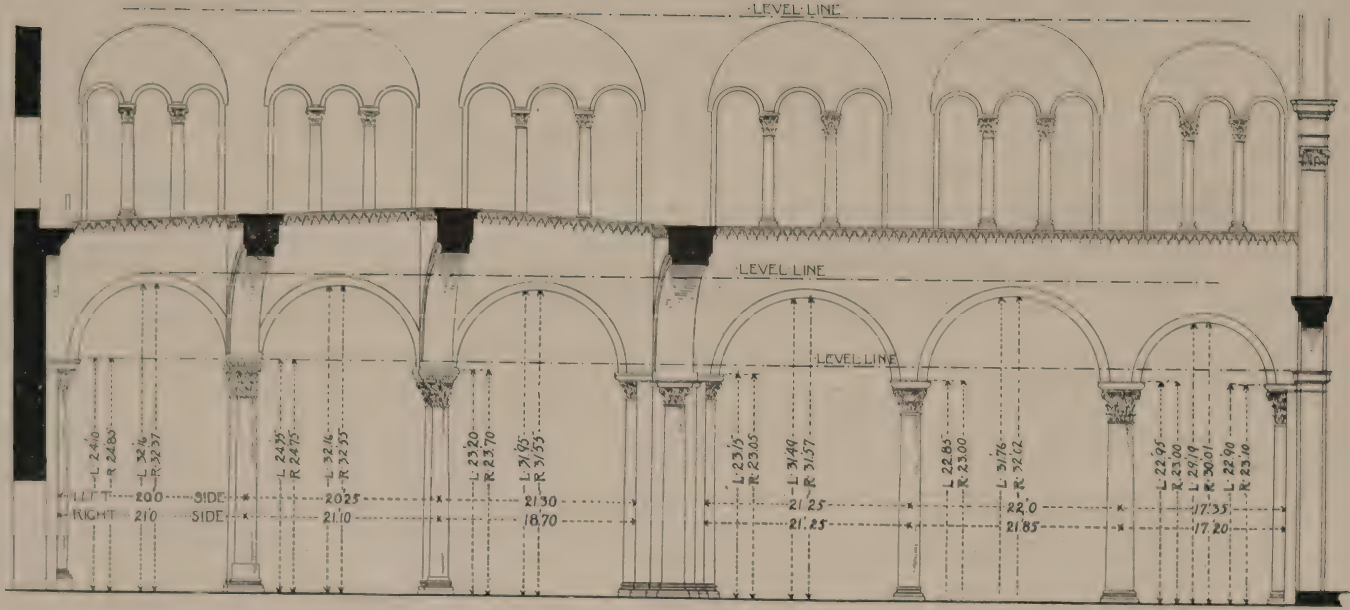


FIG. 11.—SECTION OF S. NICOLO AT BARI.

Beyond the last bay on the right is the choir. The capitals drop in this direction (measured in feet and decimals) 1.45 (left) 1.65 (right). The arches drop 3 ft. (left) and 2.36 (right). The arrangement of transverse arches and of triforium arcades is shown in this section. Brooklyn Institute Survey.

BOSTON PUBLIC LIBRARY.

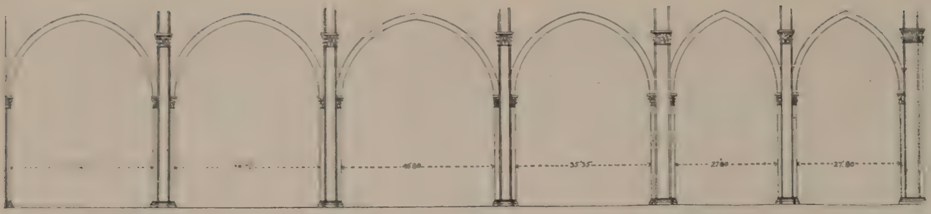


FIG. 12.—SECTION OF S. MARIA NOVELLA AT FLORENCE.

Showing a maximum diminution of pier spacings of 13 ft. in the direction of the choir. Brooklyn Institute Survey.

tion from our survey (Fig. 11). The transverse arches of this church were built in at a later date than its erection, and during the Gothic period. They develop a perspective scheme otherwise apparent in the arrangement of the arches and the capitals of the nave. As for the arcades of the clerestory their curving line builds in perspective from all points of view. That this arrangement of the arcades is not due to accident is proven by the fact that it holds on both sides of the church. The same argument as to purpose holds for the arches and capitals of the nave, viz., that the same general arrangement is found on both sides. The measures in detail are entered on the section and a summary of results is given beneath. The maximum drop of the nave arches is three feet and of capitals 1.65. (The discrepancies of intercolumnar spacing are connected with an obliquity of the ground-plan, for which the survey will be published in a later issue.)

These correspondences in devices to increase the effect of dimension are certainly not fortuitous, and as regards results they may fairly be called subtle. It is much more difficult to detect them than it is to see them after they are pointed out.

An astounding illustration of the popular oversight of discrepancies in dimension which are naturally discounted into effects of perspective is afforded by the church of S. Maria Novella at Florence, where there is a diminution of pier spacings toward the choir of so pronounced a character that there is a difference of thirteen feet between the widest and the narrowest bay (Fig. 12). In the cathedral at Arezzo there is a difference between the first and last bay of twenty-one feet (Fig. 13). The only parallel cases known to our Survey for such extraordinary discrepancies in measurements, are the converging walls (narrowing toward the choir) of S. Giorgio in Velabro at Rome, and of S. Stefano at Venice. In the former case the church is seventeen and a half feet narrower at the choir end (Fig. 21). The latter church is twenty-three feet narrower at the choir end.*

It is remarkable that a new theory, or a new point of view, for medieval churches, should obtain corroboration from such a well-known church as S. Maria Novella. Its peculiar arrangement has been so generally overlooked that there is even a published ground-plan of this church which represents the piers as spaced at regular intervals (in Reynaud's "Traité d'Architecture"). This church has, however, been mentioned in publication for the given phenomenon; the only case of such mention known to me among all the buildings to be cited. The discrepancy in measurements of spacings is mentioned by Burckhardt's Cicerone and by Baedeker's guide-book, whose art references generally follow Burckhardt, but the illusive, perspective purpose has escaped the perception of these authorities. This is clearly due to the lack of collated facts regarding similar phenomena in other churches, such as those just mentioned, and others which I will now proceed to mention. One of these cases is the cathedral of Fiesole, where the maximum diminution of pier spacing toward the choir is eight feet, as between the widest and narrowest bay; the maximum drop in the line of arches being three feet nine inches. I have here to make the record against myself that this fact either escaped my notice in 1870, or made such slight impression on me as regards its real magnitude, that it was immediately forgotten. In 1895, Fiesole was a new revelation (Fig. 14).

---

*The plan is published in the preceding Number of the Magazine.

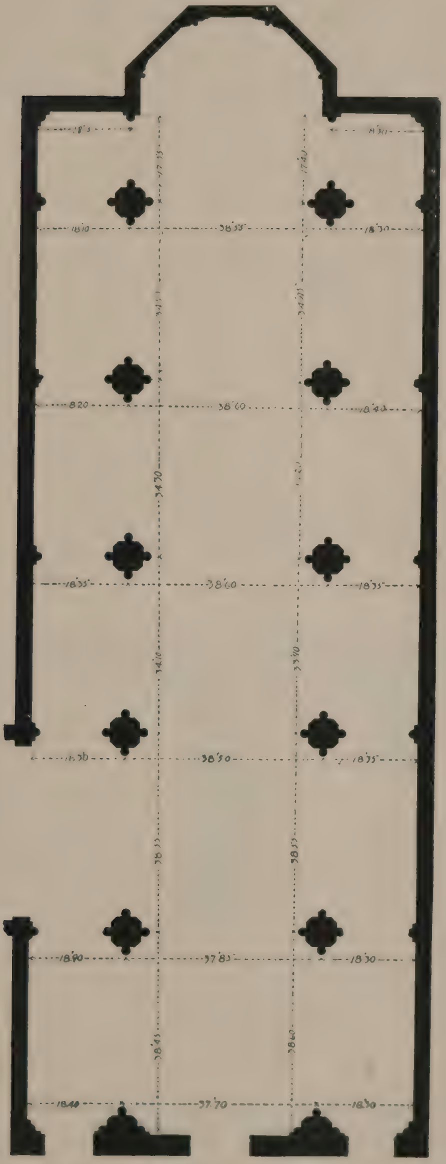


FIG. 13.—GROUND-PLAN OF THE CATHEDRAL OF AREZZO.

At the third bay the spacing decreases 4 ft.: at the last bay it decreases 17 ft., total diminution 21 ft. Brooklyn Institute Survey.

In face of a photograph* fixing the facts from a defined point of view, it seems impossible that any one should overlook them. But it is one thing to be in a large building with the eye wandering from one point to another; and another thing to have the eye directly fixed on a photograph made for a special purpose and from a special point of view, all of whose features are seized at once. There is no discounting of effects when we look at a photograph. In the building it is impossible not to discount the effect to a certain extent, even when one is aware of the facts.

As regards the instantaneous detection of the facts as stated by the survey of a church section or by a photograph made for the purpose, it should be remembered that in a section drawing like that of Fig. 14, the cutting off of the upper wall directly over the arches offers the contrast of a straight line which does not appear in the church. As regards the photograph from Fiesole (published in the preceding Number of the Magazine, Fig. 6), the cutting off of the wall over the large arch again assists the instantaneous detection of a fact which is by no means so clearly apparent in the church.

That the discrepancy in size of arches at Fiesole is generally overlooked cannot be doubted. There are too many tourists who have been in Florence (and all such visit Fiesole), who will testify to their own oversight to leave this point in any doubt. That the fact of an irregularity perhaps not wholly appreciated as to amount is occasionally noticed at Fiesole and then ignored, as having no pertinence or meaning, is doubtless also true. That is because the given observer has not happened to notice

---

*See preceding Number of this Magazine. (Fig. 6.)

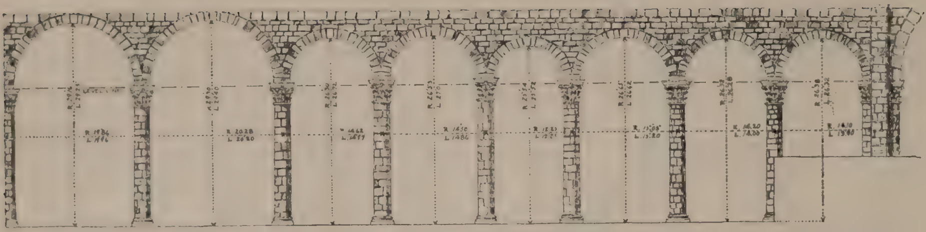


FIG. 14.—SECTION OF THE CATHEDRAL OF FIESOLE.

The choir is adjacent to the last bay on the right. The bays narrow toward the choir (maximum about 8 ft.) and the arches drop in this direction (maximum, 3 ft. 9 in.). Brooklyn Institute Survey.

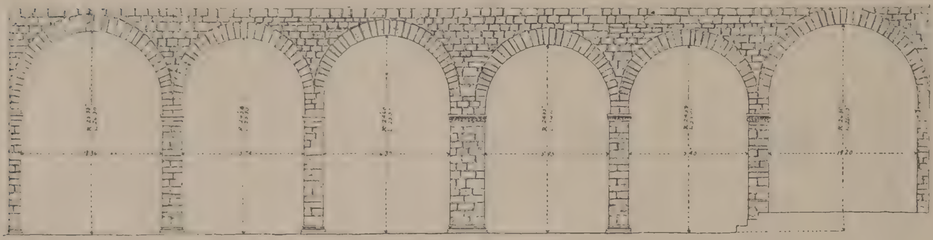


FIG. 15.—SECTION OF SAN PIETRO SOMALDI AT LUCCA.

The choir is the last bay on the right. The measures show a maximum drop in the arches of 3.30 (feet and decimals) and a maximum diminution in pier spacings of 3 ft. Brooklyn Institute Survey.

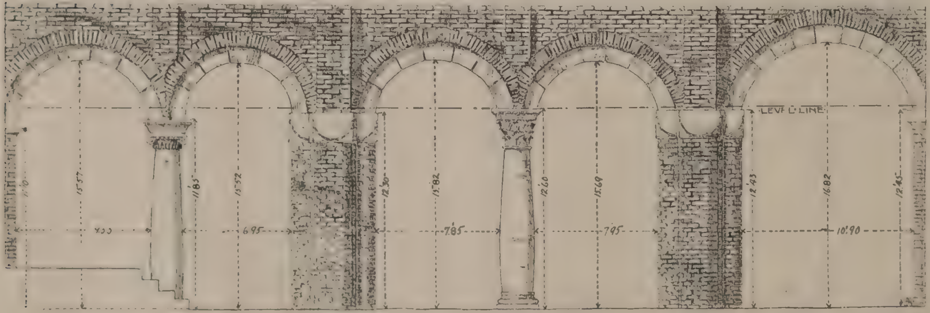


FIG. 16.—SECTION OF SAN STEFANO AT BOLOGNA.

The choir is on the left. Spacings narrow toward the choir 4 ft. Arches drop toward the choir 1.30 Capitals drop toward the choir 1.35. Brooklyn Institute Survey

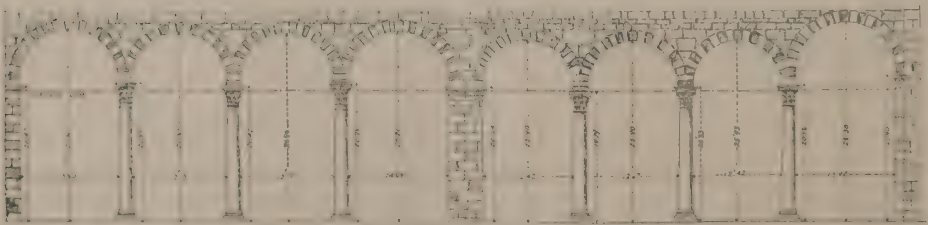


FIG. 17.—SECTION OF SANTA MARIA BIANCA AT LUCCA.

Beyond the last bay on the right are the transept and choir. The maximum drop of the arches toward the choir is 1.40 (feet and decimals). Brooklyn Institute Survey.

that the same or similar facts hold at Cremona, and in San Ambrogio at Milan, at Prato and Arezzo, and Pavia, at Borgo San Donnino, and Bologna, at Bari, Troja, Fiesole, Narni and Toscanella, at Pisa, Lucca, and Palermo, and in the Roman church of San Saba. At Lucca there are three churches of this type and at Pisa there are four. Detailed surveys have been made for all buildings which are mentioned.* The proof of constructive intention is obtained partly from the schematic arrangement of measurements, partly from a comparison of the measures on the two sides of the church, and partly from the frequent repetition of an arrangement in one direction. At Bari and Cremona allowance has to be made for some remarkable variations analagous to the phenomena in S. Maria della Pieve, at Arezzo.*

Both S. Maria Novella and the Fiesole cathedral will illustrate a subtlety generally found where this given device is used of narrowed spacings or dropping arches, viz., of giving the maximum dimensions either to the second, third, or fourth bay, according to the length of the church, in preference to giving the greatest dimension to the first bay, as was done in S. Stefano at Pisa. On entering a church, we do not generally look directly either to left or right, and we most naturally begin to make our experimental estimate of dimension a little farther down the nave. In such cases, the standard of size for the whole church is taken for granted as being that of the adjacent large arches. A mathematically perfect perspective scheme was not attempted. Perspective tricks like that of Bernini, in the Scala Regia of the Vatican, were generally foreign to the Middle Age. All that was sought was a physiological illusion based on the habits of the eye, which is accustomed to argue from the nearest dimension to others which are more remote.

As regards the beginning of a scheme at the second, third, or fourth bay and as far as a line of arches is concerned, a line which rises first and falls afterward is more effective for perspective illusion for all points of view in which both ends are visible than one with an even descent. This will be understood by experts in optics without explanation and I will not offer the reasons here. Examples of such an arrangement are seen in the clerestory arcades of S. Nicolo at Bari (Fig. 11) and in the arches and capitals of S. Saba at Rome (Fig. 23). In the given class of churches minor irregularities are frequently found in the schemes of arrangement of piers and arches, but we have in most cases an immediate check on the theory of carelessness. For example, at Fiesole the sixth arch from the façade is considerably higher than its fellows and breaks the scheme (Fig. 14). But this holds on both sides of the church at the same bay, therefore, the discrepancy is not accidental. There are side doors opposite this bay; possibly this is the explanation, but I shall show later that in many cases schemes were intentionally broken to avoid detection, or the appearance of a too obviously deceptive arrangement, or to introduce an element of irregularity for its own sake; that is, for the sake of variety or the picturesque. If we compare the heights of arches at Fiesole, we shall find that none are commensurate, and yet we shall be able to prove that the heights were all purposely calculated, approximately as built. Both arches of the sceond bay are higher than the first, both arches of the third bay are lower than the second, both arches of the fourth bay are higher than the third, both arches of the fifth bay are lower than the fourth, both arches of the sixth bay are higher than the fifth, both arches of the seventh bay are lower than the sixth. This cannot be accidental; the law of chances is against it. When such facts are repeated in a multitude of cases, as regards correspondence of details in two broken schemes, certainty becomes absolute that the builders knew what they were doing, and this certainty reacts on the cases where irregularity appears without the evidence furnished by duplication. It is too bad that we should have to struggle for a proof of this, but such is the prejudice of the nineteenth century in favor of its own ideals of mathematical and exact symmetry, that up to date the astonishing impression rules the civilized world that the Middle Ages produced the most remarkable works of art without knowing how they did it.

---

*An exhibit of these surveys was made in Brooklyn in June, which will be repeated this October, November and December.

*Plan in the preceding Number of the Magazine. See Fig. 9.

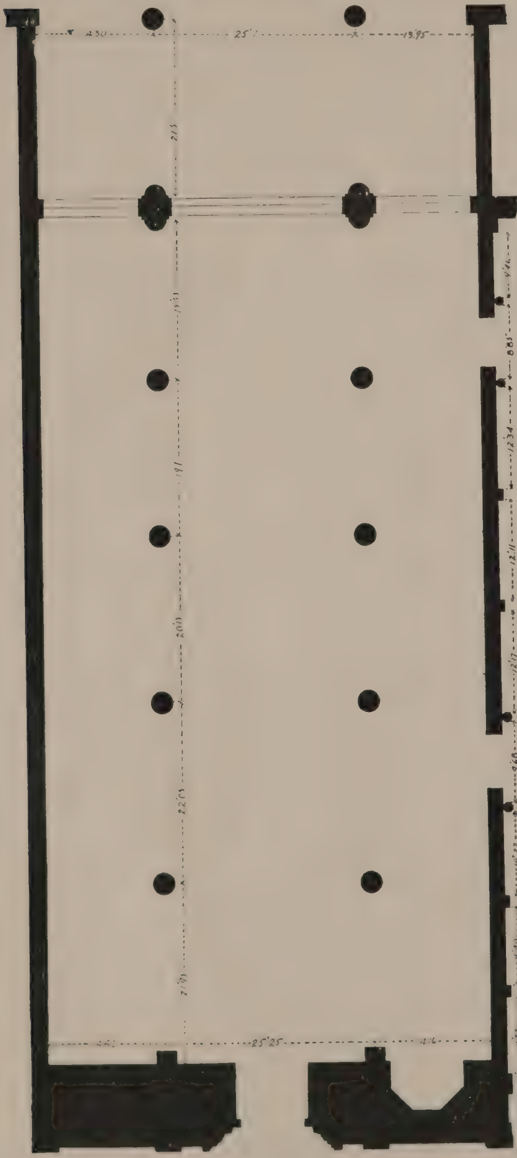


FIG. 18.—GROUND-PLAN OF THE CATHEDRAL NAVE OF PRATO.

Showing a maximum diminution in pier spacings of 3 ft. in the direction of the choir. The last bay widens toward the transept which is omitted from the plan. Brooklyn Institute Survey.

The subject of intentional irregularities due to a sentiment for the picturesque, deals with another class of medieval phenomena and the proofs for intention are obtained in various ways, to be subsequently explained. I only wish to say here that irregularities in the employment of a perspective scheme can generally be proven intentional off-hand, as I have just shown at Fiesole. The limit of irregularity due to indifference to regularity or to the natural limitations of building material or building methods varies in different buildings. It can generally be estimated by a comparison of various measurements. There is an underestimate of the technical capacities of the best medieval builders in some professional quarters, owing to the medieval frank disregard for the conventional accuracy of the modern architect. This underestimate is also partly due to the hasty assumption that some carelessly constructed buildings represent universal practice. In fact, up to date there has been no effort to distinguish between intentional and accidental irregularity in medieval building.

In basilicas, which have no transept, and showing a perspective scheme, the last span of arches at the choir generally widens, for practical reasons, and to give the extra space desired for the chancel. (See S. Pietro Somaldi, Lucca; Fig. 15, and S. Stefano, Bologna, Fig. 16.) There are also many cases of an arrangement of arches intended to obviate abrupt contrasts of dimension, or abrupt breaks in the line of arches. Where the church has a transept the span next adjacent is frequently increased in size to effect a transition of lines and dimensions. This occurs both in churches without the previous drop in

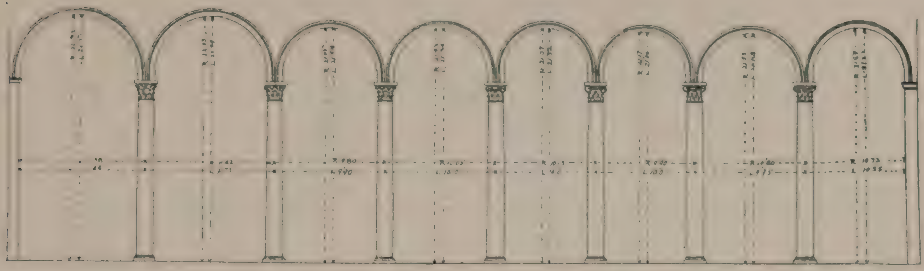


FIG. 19.—SECTION OF S. FREDIANO AT PISA.
The last bay on the right is the choir. The heights of the bays between entrance and choir show a drop of 1.62 (left) and .79 (right) in the direction of the choir. Brooklyn Institute Survey.

arches, like S. Paolo Ripa d'Arno at Pisa, and in others which have the drop, like S. Maria Bianca at Lucca (Fig. 17), or the diminution of spacings, like the cathedral of Prato (Fig. 18). Such an abrupt contrast as we find in the sixth bay at Fiesole was clearly intended, but it is quite unusual. The Florentine Romanesque is not as subtle as that of Byzantine Pisa and the Florentine churches are generally lacking in "refinements."

My experience in the Pisan church of S. Frediano will show the difficulty of detecting these deceptive arrangements, even when they are anticipated, or careful examination is made for them. During three weeks spent in a first visit to Pisa our party examined S. Frediano three times without detecting a scheme here shown by survey (Fig. 19). On this occasion there were three pair of eyes at fault, for my survey of 1895 was assisted in many parts of Italy by my nephew, a young architectural student,* as well as by a regularly employed surveyor. On a second visit to Pisa, when I was attended by Mr. McKecknie, S. Frediano was again visited and again without discovery of the facts. Mr. McKecknie's final departure for home was made at this time, after the expiration of the five months which he had contracted to spend with the expedition, and I was left alone in Pisa. I subsequently made three separate visits to S. Frediano, having a suspicion that there was something to do in this church and finally undertook to take the measures, which show a drop of arches on both sides of the nave, as shown by the section. A similar experience was made in Milan, where my time was limited. I hesitated a full hour in San Ambrogio before risking the time required by a survey without certainty of results. The survey showed a maximum diminution in pier spacing of three and a half feet and a maximum drop in the arches of one foot. A like experience was made in the Siena cathedral, where our party spent two days' time before noting that the first pair of arches in the nave are three feet higher than the following arches. I did notice a diminution of spacings at Prato of three feet until the measures had been taken. I shall be able to show in the next issue of this Magazine that the limit of error due to carelessness or the coarseness of materials, in medieval buildings of the class quoted, is not greater than three inches. I ought to add that the case of the nave arches at Siena is quoted only as an instance of the way in which important discrepancies of dimension may be overlooked in the very act of making a search for them. There are no indications of a scheme in the measures of the other bays at Siena.

There are three published ground-plans of Italian churches which have walls converging in the direction of the choir; although the implication of purpose contained in these plans has been overlooked by the given publications; clearly because the related facts have not been collated. These churches are the Roman basilicas S. Bartolommeo, S. Giorgio in Velabro, and S. Maria in Cosmedin. As to the perspective results of such converging lines, we shall first draw attention to a diagram of the Piazza of San Marco at Venice (Fig. 20). The case of S. Giorgio in Velabro, at Rome, represents a similar plan and involves a similar optical result (Fig. 21). A small plan published by Hubsch, without measures, seems to show these facts with approximate exactitude, but Hubsch has published another Roman church (S. Maria in Cosmedin), which shows a convergence of five feet, as having exactly parallel walls. Knapp publishes a large plan of the same church, with exactly parallel sides. S. Maria in Cosmedin is also given an absolutely rectangular and mathematically parallel plan by Gailhabaud, who also publishes S. Giorgio in Velabro incorrectly. I have no knowledge of any plan of S. Stefano at Venice, excepting the one made by our survey. This church is mentioned by Street, "Brick and Marble Architecture in North Italy," as having a nave 48 feet wide. Clearly Mr. Street must have overlooked the fact that this nave is 35 feet wide at the choir end* and that the whole church narrows in, 23 feet. I took the measures in San Antonino, at Piacenza, showing that its walls have a convergence toward the choir of 9 feet; but this church has been published by Osten, "Bauwerke in der Lombardei," as an absolutely regular parallelogram. I mention these discrepancies between the real facts and the published plans because they show that the whole subject of medieval irregularities has been neglected up to date.

---

*Mr. Nelson Goodyear.

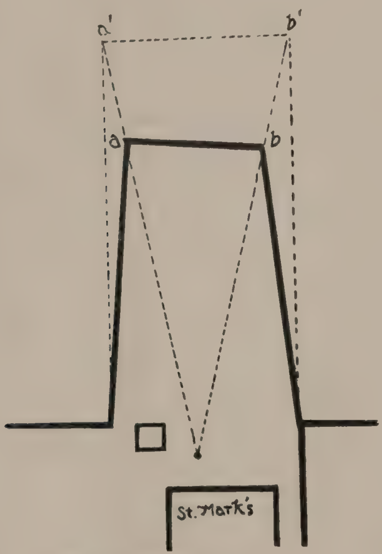


FIG. 20.—PLAN OF THE PIAZZA OF S. MARCO AT VENICE.

Showing the apparent increase of dimension produced by the converging sides of the piazza. From Thiersch, *Optische Täuschungen auf dem Gebiete der Architectur.* (Optical deceptions in Architecture.)

The most remarkable oversight of modern times in the study of Italian churches regards those with pavements sloping upward toward the choir. The perspective effect of this arrangement is suggested by the diagram (Fig. 6). In 1870, I knew of one case, the church of San Pierino at Pisa. Our survey of 1895 discovered over eighty-five churches having this peculiarity. It occurs in churches as well-known as the cathedrals of Genoa, Siena and Orvieto, the Capella Palatina at Palermo, the church of S. Francis at Assisi, S. Mark at Venice, and the well-known church of S. Maria Ara Coeli at Rome (Fig. 22). See also sections of S. Saba at Rome (Fig. 23), and of S. Giovanni in Zoccoli at Viterbo (Fig. 24). Another illustration is that of S. Pietro at Assisi, published in the preceding number of this Magazine (Fig. 7). This phenomenon has even survived in the Renaissance period In some apparently Renaissance cases we may assume an older pavement as having been relaid on the slope of an older church, which has been made over or rebuilt. This may hold of some Renaissance churches in Genoa, but the slope in the cloister at Calci, near Pisa, is sixteenth century. The slope also occurs in the Renaissance churches S. Annunziata and S. Gaetano at Florence. The Renaissance cases are, however, wholly exceptional, outside of South Italy, where

---

*Published in the preceding Number of the Magazine.

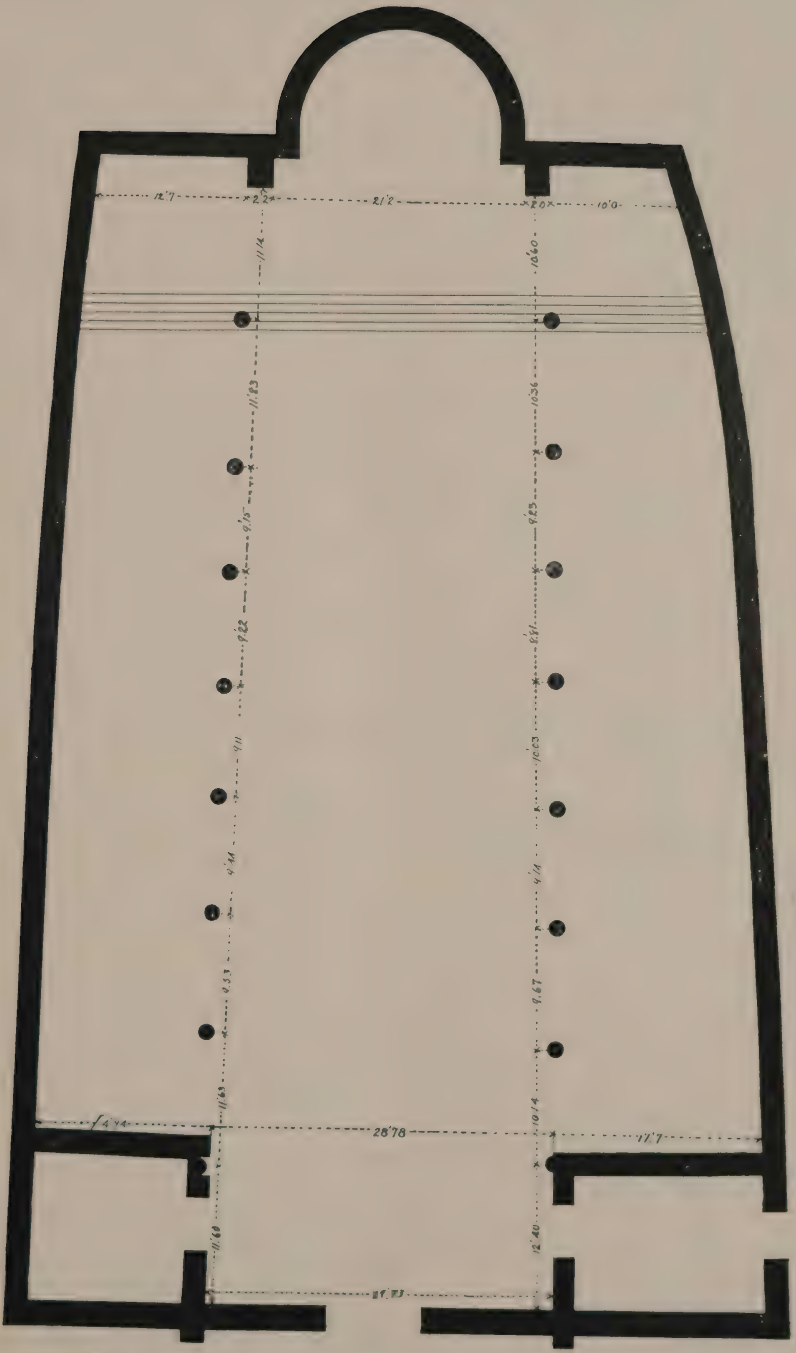


FIG. 21.—GROUND-PLAN OF S. GIORGIO IN VELABRO AT ROME.
The walls converge toward the choir to the amount of 17½ ft. in a length of 81 ft. Brooklyn Institute Survey.

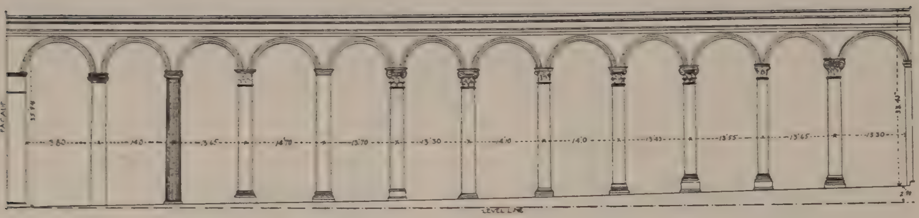


FIG. 22.—SECTION OF S. MARIA ARA COELI AT ROME.

Showing a rising slope of the pavement toward the choir of 2 ft. 9 ins. The columns are so arranged in diminishing heights as to bring the arch line down to the horizontal within 3 inches. On the opposite side the arches are brought 9 inches below the horizontal. The choir is beyond the last bay on the right. Brooklyn Institute Survey.

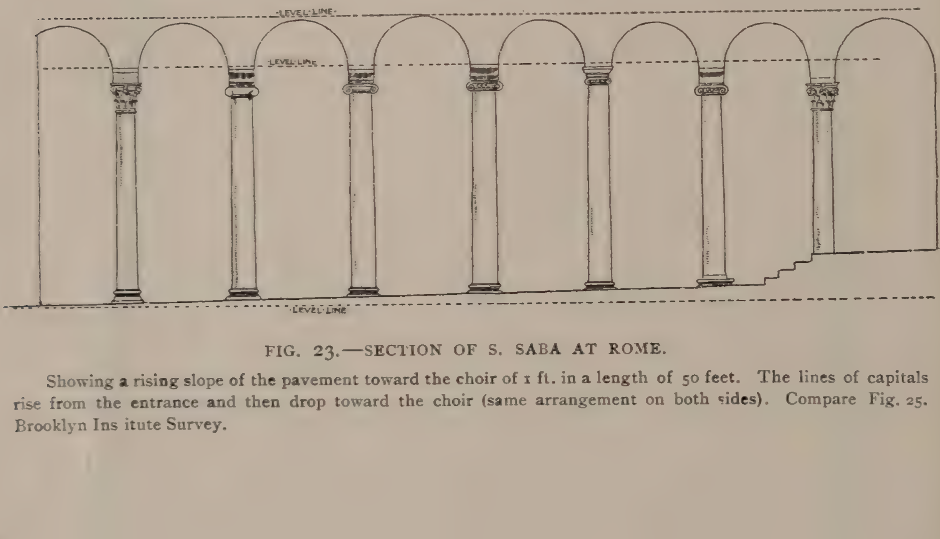


FIG. 23.—SECTION OF S. SABA AT ROME.

Showing a rising slope of the pavement toward the choir of 1 ft. in a length of 50 feet. The lines of capitals rise from the entrance and then drop toward the choir (same arrangement on both sides). Compare Fig. 25. Brooklyn Institute Survey.

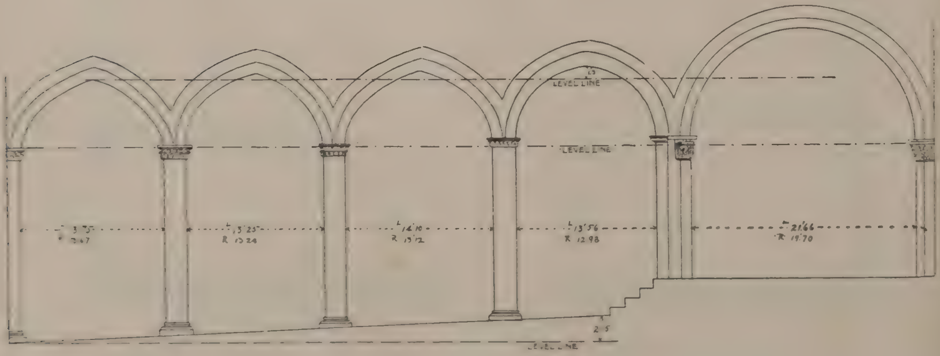


FIG 24.—SECTION OF S. GIOVANNI IN ZOCCOLI, AT VITERBO.

The pavement rises 2.15 in 50 ft. Brooklyn Institute Survey.

other survivals of medieval arrangements are much more general than they are elsewhere. In the whole of Italy I have only been able to collect six cases of a slope downward towards the choir, and all of these appear to have been due to building to the surface.

There is no phenomenon so widespread in Italy as that of the rising pavement. It can be dated to the fifth century in S. Sabina at Rome, and is probably related to the already known cases in Egyptian temples, in which cases it has been ascribed to a purpose of perspective illusion by Maspero, by Poole and by Rawlinson. Rawlinson says, in his "History of Egypt," p. 258: "The contrivance for augmenting the apparent size of buildings of which we have to speak in conclusion, is the following: Egyptian buildings, of large extent, for the most part rise as we penetrate into them. When we pass from one limb to another, we generally ascend a few steps. Sometimes, however, the ascent is more gradual. At the Ramesseum and again at Edfou, the level of the ground rises from column to column, each column being placed on a low step a little above the preceding one. The effect is similar to that produced in a modern theatre by the slope of the floor to the back of the stage. It is aided by the general arrangement of doors and pylons which diminish in size as we advance. An illusive perspective is thus obtained, the vistas of pillars seem twice the length that they really are and the entire building appears to be of a length almost interminable." Some of the facts above quoted have been noticed by me at Denderah. I believe that Maspero is the original authority for suggestions on this subject.

In the Italian churches the eye tends to translate a part of the rising slope into a downward slope of the arches, according to a well-known law of optical illusion, by which the eye tends to average between any two lines or surfaces, a deviation from the actual normal, which really holds only for one of them. This illusion offers an additional reason for the general oversight of this phenomenon. The optical transfer minimizes a part of the lower slope and both convergences are set down to perspective. In my own experience I have found it impossible to correct the impression that the arches drop towards the rise of the pavement, when looking across the nave of a church, and actual measurements have been necessary in many cases to correct this impression, which is naturally assisted by the knowledge that in many churches the arches actually do drop in such a manner towards the choir. As regards oversight of this phenomenon, I have not yet happened to meet a single individual who knows of its existence in a single Italian church. A rise of one foot in four bays was overlooked by both my companions in the first Genoa church which we examined. Some fellow travellers did not notice a rise of a foot and ten inches in the Genoa cathedral. I spent the best part of a day in S. Francis at Assisi without noting a slope of one foot and did not discover it until a second visit to Assisi. A rise of three feet in 81 feet was overlooked by an artist friend at Ravello. The astonishing fact about this rise is the frequency of its appearance in all degrees of pitch between three inches and over three feet for the length of the church. The wide diffusion forbids any local explanation, and the uniformity of direction as regards the choir can have only one meaning. There is no doubt that individual instances of the slope must have been casually noticed by many persons. Here again it is the absence of collated facts or the indifference of the observer which have prevented the drawing of conclusions.

All people who visit Rome are familiar with the church of S. Maria Ara Coeli (Fig. 22). I have interviewed a number of experts who know this church and who are not aware that the pavement has a rising slope of over three feet. I must plead guilty myself to having overlooked this fact in 1870 and in 1895 I overlooked the fact that the circumference of the columns near the transept is three feet less on both

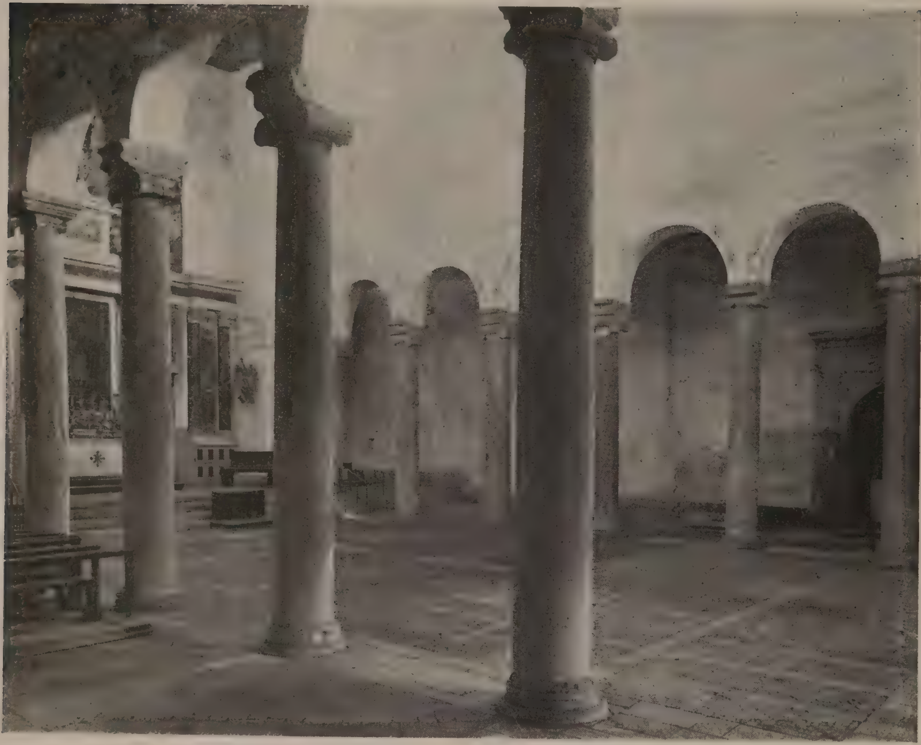


FIG. 25.—THE SLOPING PAVEMENT OF S. SABA AT ROME.
(Compare Fig. 23). Photographed for the Brooklyn Institute Survey.

sides of the church than it is at the entrance, which was observed by Mr. McKecknie. This diminution in size of the columns shows the care taken to avoid such an actual upward slope of the arch line as would result from placing a line of columns of equal height on an upward sloping foundation. These columns being taken, as usual in the old basilicas, from earlier Pagan ruins, it was possible to select them of gradually decreasing height and size in such a way that the circumference of a column near the transept varies as stated, from that of one at the entrance, by three feet. Thus the gallery line above, which corresponds closely to that of the arches, rises but three inches on one side and drops nine inches on the other, while the rise of the pavement is two feet nine inches, in the same distance.

The church of S. Saba at Rome illustrates a similar choice and arrangement of columns, with the distinction that here, the arches drop on both sides of the church to meet the rise of the pavement, thus accenting still farther an effect of illusive perspective. (Fig. 22.) In general, it holds of all these churches with rising pavements that the arch line is brought down to the horizontal and the effect is (as explained) to make the arch line appear to drop still lower. This again involves an illusive effect as to one's position in the church. In looking straight across the nave the point of view appears to slant toward the choir.

The following churches, which have the rising pavement, also have the drop in arches: S. Maria della Vittoria at Palermo (the vaulting drops three feet), S. Saba at Rome, S. Pietro at Assisi,* S. Frediano and S. Stefano at Pisa. A complete catalogue of the eighty-five churches, with the measurements for each case, will be soon published.

---

*Illustrated in the preceding Number of the Magazine.

So far, we are only at the threshold of a curious topic. The phenomena so far noted are of four descriptions, all of which will come inside the experience and practice of a modern theatrical scene painter; the illusive effects of an upward sloping floor, of a downward sloping arcade, of converging walls,or other variations of dimension, as in pier spacings, transverse arches, etc., tricking the eye in one direction. But in so far as these devices tend to an opposite effect in a contrary direction, they are not generally available for exteriors. It would also seem to hold for interiors that in so far as the devices are subtle and inconspicuous, in so far they would be comparatively ineffective, and that in so far as they are bold and strongly defined, in so far they are open to detection. The general oversight by travellers and Italians of the very palpable perspective trick which was played by Bernini in the Scala Regia of the Vatican, and the general oversight of the eight feet discrepancy in pier spacings at Fiesole, or of the thirteen feet discrepancy in S. Maria Novella at Florence (which I found to be unknown to some very distinguished Italians at Florence) show that boldness in the use of such devices may escape general detection and yet these are tricks which are palpably open to detection. There are, at all events, other optical refinements in medieval building of a far more subtle character.

I have placed these more definitely obvious devices in the front of my demonstration, because they establish one conclusion, which has so far never been admitted or asserted for medieval builders, viz., that they did contemplate and consider optical effects. When this important point is once admitted, we have a foot-hold for the consideration and explanation of more curious phenomena.

We will close the list of palpably intended perspective devices by quoting measurements from the gallery levels and sections of the Pisa cathedral to be published in the next issue of the Magazine. The arrangements here are the most interesting, because the most subtle, which have been found by the survey. The drop of the nave arches in this cathedral begins at the fourth bay and amounts in feet and decimals, to 1.64 (left) and 1.98 (right).

We will also quote measurements for some of the churches not illustrated and so far too briefly noticed. In all these cases the choir is to be understood as the objective point of the deceptive arrangements. In S. Michele at Pavia the combined measurements for nave and gallery arches show a drop of 19½ inches (left) and 15 inches (right.) At Borgo San Donnino the pier spacings narrow 20 inches (left) and 21 inches (right). The arches drop 10 inches (left) and 12 inches (right). At Cremona the bays narrow from the second bay to the choir 74 inches (left) and 67 inches (right), with a corresponding drop in the arches. At Piacenza (cathedral) the bays narrow between the second bay and transept 26 inches (left) and 15 inches (right). In S. Michele ai Scalzi, Pisa, the capitals drop, from second to last, 2.70 (left) and 2.64 (right) (feet and decimals). In S. Pietro, Assisi, the arches drop 2.60. In S. Maria in Pensola, at Narni, the capitals drop .75 (left) and .80 (right). At Troja the capitals drop .57 (left) and .35 (right). Surveys have been made for these and for other churches, giving measurements in detail, which will be published shortly.

Wm. H. Goodyear.

(The continuation of this Paper will appear in the next issue.)

THE WORKS OF R. H. ROBERTSON.

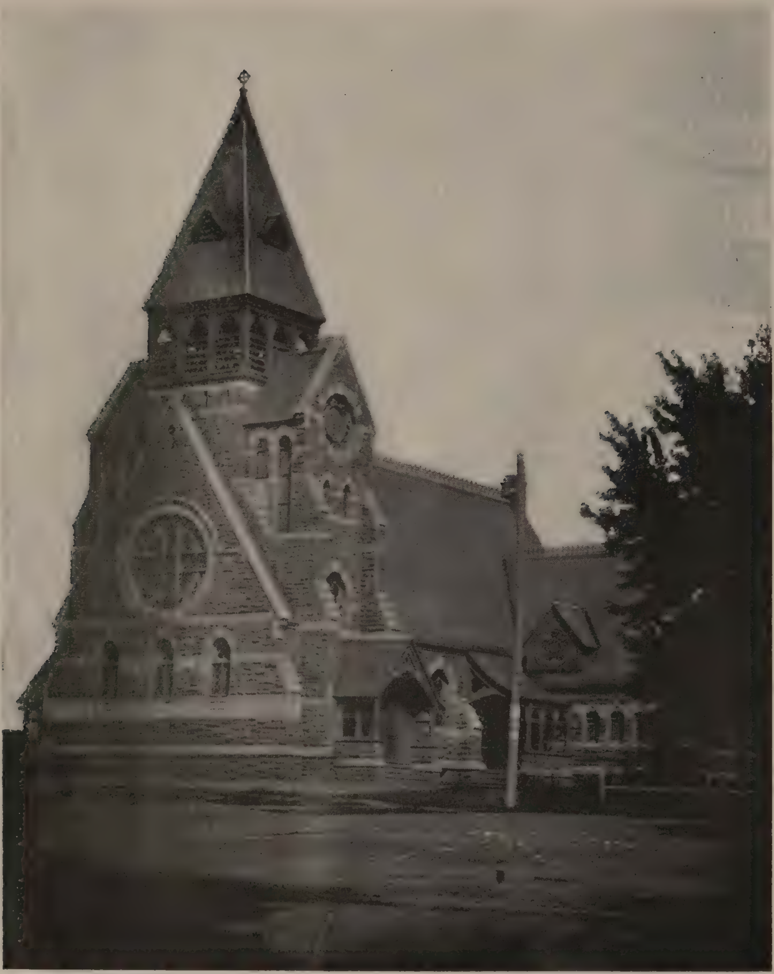
ROBERT HENDERSON ROBERTSON was born in Philadelphia, April 29, 1849, and his general education was obtained at Rutgers College. After graduation he first entered the office of Henry Sims, of Philadelphia, whose ecclesiastical work in academic Gothic is that by which he is best remembered. After leaving Mr. Sims, Mr. Robertson continued his studies in the office of Mr. George B. Post, in New York, and began practice on his own account in that city in 1871. Within the two or three years succeeding he had made himself remarked among persons interested in architecture by his published designs for seaside cottages and country churches, by a competitive design for the New York hospital, and by an executed work—the Phillips Presbyterian Church, in upper Madison avenue—in a free and rather individual version of Victorian Gothic. In 1875, upon the appointment of Mr. William A. Potter to be Supervising Architect of the Treasury, in place of Mr. Mullett, he and Mr. Robertson formed a partnership under the style of Potter & Robertson, which lasted until 1878. The results of this partnership were a number of college buildings and the local hotel at Princeton, and some country churches, in the design of which both partners took part. Soon after the dissolution of the partnership Mr. Robertson, like most other sensitive practitioners at that time, was greatly impressed with the work of Mr. Richardson, and with the capabilities of Romanesque architecture, and for the succeeding decade, most of his own work, which rapidly increased during these years in extent and importance, was based upon the Romanesque, whether domestic, commercial, ecclesiastical or "institutional." Still later he underwent the influence of the classic revival, and since 1890 much of his city work has borne testimony to that influence.

This meagre outline of Mr. Robertson's professional career shows in the first place that his training and his practice have been exclusively American, and, in the second place, that he has taken part in every one of the successive "movements" that have agitated American architecture in his time. He began his work, as nearly every sensitive designer trained in the same way and at the same time began it, in Victorian Gothic. I ought to have inserted in its proper chronological place that he toyed awhile even with Queen Anne, the "free classic" with which Mr. Norman Shaw startled the British islands twenty years ago, and of which Mr. Hudson Holly made himself the literary apostle on this side, the voice of one crying in a wilderness of Victorian Gothic. Mr. Robertson's tendency in the direction of Queen Anne never amounted to much more than a "velleity," and as to the works in which it was embodied it may be said of them, as Johnson said about Warburton's notes on Shakespeare: "I suppose, now that the ardor of composition is remitted, he no longer numbers them among his happy effusions." That the robust Romanesque of Richardson made an end of Queen Anne was distinctly to its credit. In each of the modes in which he has really worked it may fairly be said of Mr. Robertson that, without any care at all for academical correctness, he has managed to attain an individual and an interesting version of the style.

The very first example of Mr. Robertson's work known to me, the Phillips Presbyterian Church (1871), indicate his talent and prefigures his subsequent successes. It is Victorian Gothic, there is no doubt about that, and it exhibits the indifference to academical correctness which was especially the characteristic of Victorian Gothic, as it was practised on this side of the Atlantic, but it shows the individuality which in some cases was a compensation for this indifference and in others an aggravation of it. The general scheme is very successful. There is an effective balance, without any attempt at formal symmetry, between the two sides and they are effectively reconciled and dominated by the central feature, the big angle-tower of which the central third is a square and solid shaft. The tall and narrow openings on each side of the gable on the avenue front serve their purpose of detaching the gable, while keeping the whole front in one plane, and the openings are so placed and treated as to relieve the expanse of wall without weakening it. The tower with its saddle-backed roof is very good indeed. The color-treatment is more violent in its contrast than its author, or any other designer, would adopt to-day, and the detail generally more insistent in scale. But the motive is valuable enough to be worth developing by the author's later lights, and as a first work the church is full of promise.

The other works of the architect's novitiate were for the most part country houses. In the early seventies it was very unusual for an architect to be invoked to design a city house, the speculative builder applying his Procrustean recipe with equal hand alike to the huts of the poor and the mansions of the millionaires, which were mere expansions of the brownstone fronts of the ordinary householder. The country houses, and especially the shore cottages, were by no means the sumptuous erections of a later day, but the simplest possible constructions of clapboards and shingles, in which the architectural effect of the whole depended mainly upon the picturesqueness of the outline, and of the detail upon the most straightforward and vernacular treatment of the humble material. Some of our architect's earliest essays in this kind were such as he need not be ashamed of to-day. Indeed, such a cottage as that of Commodore Baldwin, at Newport, or as some of the shore cottages on the Jersey coast are distinctly more appropriate to their purpose of "villegiatura" than the palaces which it is now the fashion to rear in like situations.

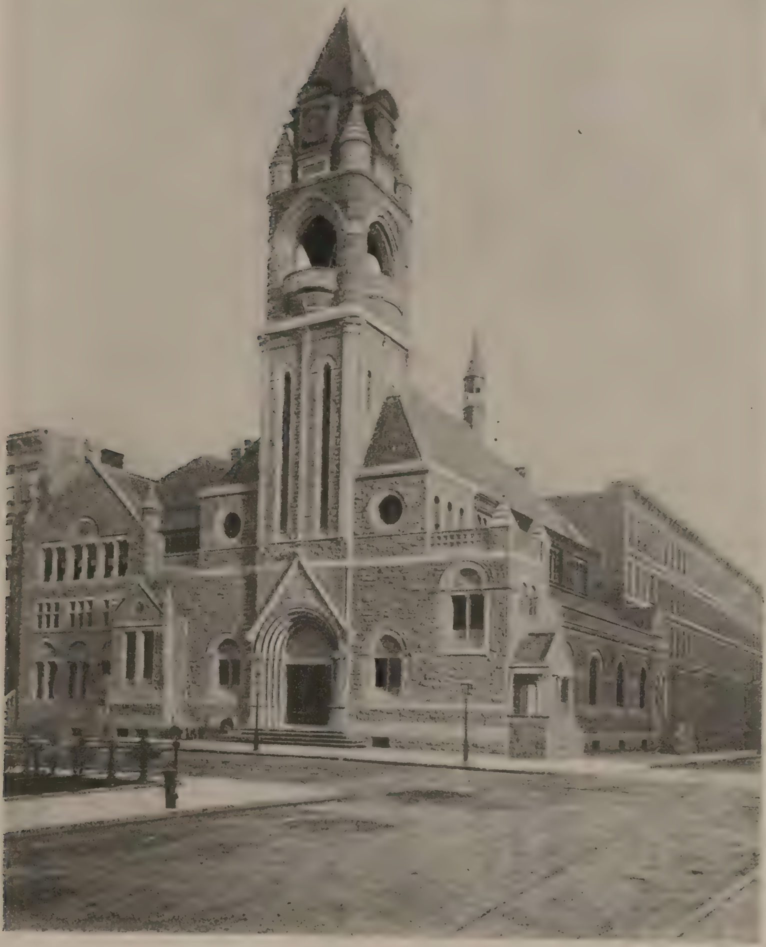
Perhaps the best known results of the partnership of Potter and Robertson are the buildings at Princeton, where the individual works of the senior partner are, however, still more in evidence. The works of the firm there comprise Witherspoon Hall and the hotel. These are both in Victorian Gothic, and the hotel very much in Victorian Gothic, its red brick walls being emphatically belted with light stone, of which the alternate voussoirs and the lintels of the lintelled openings of the arched openings are also composed, and additionally variegated by the parti-colored slate of the roofs and of the tower that animate the skyline. To say that the hotel is good as country hotels go would be to damn it with praise altogether too faint, for we all know how badly they go. In fact it is a very animated and picturesque building, and I do not recall any of the later exceptions to the rule of badness, exceptions in which picturesqueness is attained by shingles and creosote, in which the result is more satisfactory or more strictly the consequence of faithful and artistic design, or in which animation is gained at less sacrifice of repose. Witherspoon Hall is properly of a much more sober aspect, a cliff of rough, gray stone, kept as solid as the exigencies of the lighting would allow, but yet not solid enough for the best effect, set upon a base of a darker stone with which also the wall is banded, and crowned with a steep roof, this time in monochrome. It is in the gabled end that the need of many windows entails damage upon the architecture. The entrance front, however, is gratifyingly massive and is moreover exceedingly well composed, with its recessed centre, in which the solidity is rather emphasized than weakened by the staircase lights, and the effective balance of the two projecting and unequal wings.



Clifton Springs, New York. CHURCH (1876). Potter & Robertson, Architects.

A still more successful composition is that of a church at Clifton Springs, in which the lateral porches are carried up into a narrow gabled transept, cut at the centre by the main gable, while the whole pyramid culminates in an open wooden belfry steeply roofed. This is really a brilliant performance. Mr. Robertson employed the same motive many years afterwards, in the church at Madison avenue and Sixtieth street, but not, it seems to me, so successfully in the complete subordination and convergence of the whole mass to the central feature.

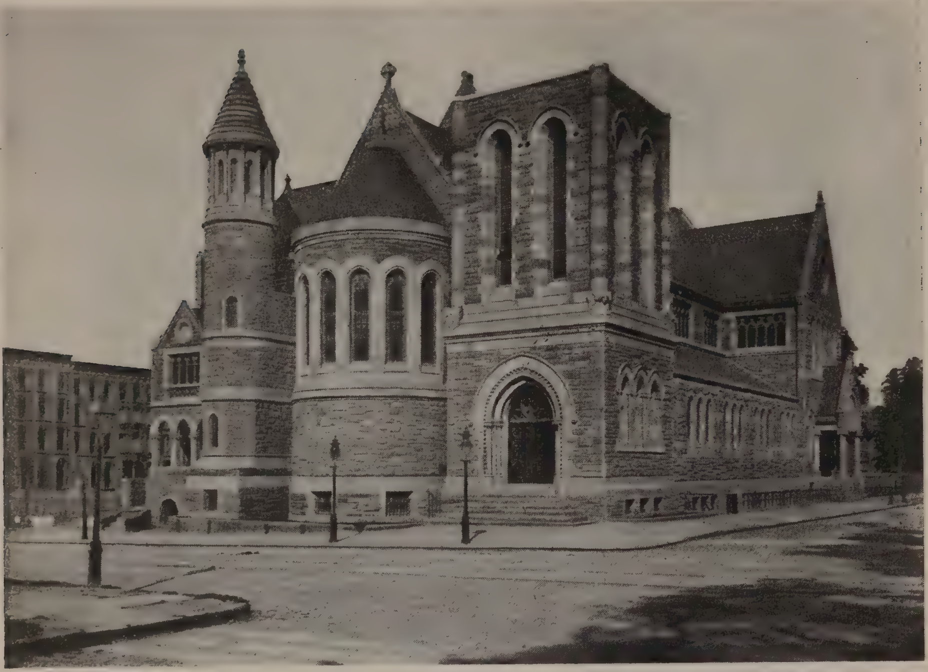
As all architects know, those were lean years that followed after the panic of 1873 had done its perfect work. But during these years Richardson found enough work to keep him busy, and the architects of the whole country interested, and when the revival of building came, early in the eighties, there was scarcely one of the younger and more open-minded designers whose work did not show some trace of his influences. Mr. Robertson's work for the decade shows that he felt this influence strongly, and the most conspicuous and important of his buildings between 1880 and 1890 may be classified as Romanesque. A glance



MADISON AVENUE M. E. CHURCH (1884).

60th Street and Madison Avenue. R. H. Robertson, Architect.

at the illustrations will show that he has never been a purist, nor aspired to the praise of academical correctness, and he took up the Romanesque in his own way and arrived at his own expression in it. Perhaps the first of his works in this kind to attract general attention was the Methodist church, at Madison avenue and Sixtieth street, to which I have just referred as showing the same motive employed in the church at Clifton Springs. This, as will be seen, was rather loosely Romanesque, and not at all Richardsonian. Indeed, Professor Kerr, who, in his continuation of Fergusson, gives this church and St. James', further up the same avenue, as typical illustrations of American freedom in church architecture, denies that it is Romanesque at all, and calls it "round arched Gothic." We need not quarrel about names, and we may own that the style of this is designated rather by the subordinate parish building at the left, which is pretty unmistakably Romanesque, than by the church itself, of which the main entrance, for example, and the clerestory are quite distinctly Gothic. When I



ST. JAMES' CHURCH (1887).

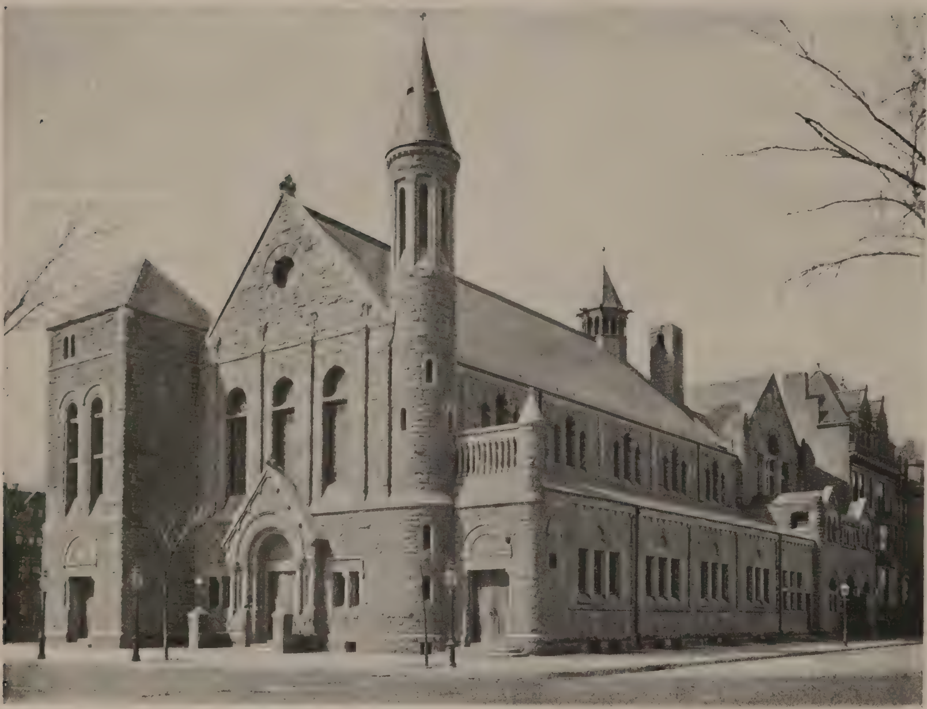
Madison Avenue and 71st Street, New York City. R. H. Robertson, Architect.

say that the motive is not so consistently worked out here as in the earlier example I mean mainly that the tower is too important to serve merely as the apex of the pyramid. The broad masses at the angles supply an ample base, but the transverse mass, here hipped instead of gabled, seems to foretell a mere finial rather than the stark tower, without a separate substructure, but at its base in the plane of the main wall, which rises through it, and the predominance of which tends even to confuse what would otherwise be the main motive of the façade. The main entrance, with its deep and modelled arch, and with the smaller arches flanking it, is very successfully managed. The shaft of the tower, after it has disengaged itself from the wall at a point marked by a band of flowing leafage, rather classical than even Byzantine in treatment, is appropriately stark and solid, the strong vertical lines of its narrow openings enhancing its apparent height. The treatment of its crowning member with the rounded angles developed into capitals, and with a cornice which indicates rather a separation than a transition is less fortunate. The belfry stage is evidently not a belfry stage, but rather a watch-tower, the angle openings in each face being quite open to the sky and furnished at the base with a projecting balcony. The relevancy of such a crowning feature to a church tower is not obvious, but the picturesqueness of it is, and the tower is very effective,although a plain hood of roof would have crowned it more appropriately than the complicated roofing which has been devised for it. The plainness and amplitude of the rough-faced wall forms a good foil for the more elaborated features, and for the carved ornament which is sparingly introduced, and its brown contrasts well with the red tiles of the roofs. Undoubtedly this is one of our noteworthy churches.

Its successors in the same kind are even more noteworthy. St. James' at

Madison avenue and Seventy-first street, the other example chosen by Professor Kerr of American freedom in church architecture, is scarcely Romanesque at all in detail, being, so far as it need be classified, in an early, indeed the earliest, phase of French Gothic. Still, the reliance it shows upon the disposition of the masses as the source of its effect,and the simplicity of the architectural detail, including the paucity of mouldings, pretty evidently ally it with the Romanesque revival begun by Richardson, and it could scarcely antedate that revival. The peculiarity of the church is that the apse occupies the centre of the front between the tower and the parish building, from which it is separated by a turret. One would suppose from the illustration that this arrangement had in view to preserve the orientation of the altar. In fact the orientation is reversed, for the apse is at the west end. The unusual disposition has in view only a picturesque composition, and this it decidedly attains. The doorway at the base of the tower is very well and purely detailed in early Gothic, while the shaft of the tower derives a pretty distinctly Romanesque expression from the powerful roll-mouldings at the angles and from the displayed symbols of the Evangelists which decorate the merging of these into the wall at the base. The other Romanesque detail is the "lisene" or flat buttress, which marks the division of the bays along the side, and which, like the angle-rolls, is a reminiscence of Lombardic building. Only the first stage of the tower, as will be seen, is completed. The next, the shaft proper, shows two very tall openings in each face, and, above an open and rather rich belfry stage, a crowning lantern. The tower is evidently necessary to the completion of the composition, but even in its incomplete condition, this west end will be admitted to be a very successfully studied performance. The apse which is its central feature is well framed by the gable wall above it, and between the plain mass of the tower and the subordinate building. The plain flank of aisle-wall and clerestory is terminated at the east end by a transept balancing the tower and completing the composition. It is an illustration of the freedom of eclecticism which has been employed in the design that the gable of the picturesque porch which forms the entrance to this transept is filled with Perpendicular tracery. The side of the church, with the balance of the terminal masses—the tower and the transept—is as effective in its way as the front. In spite of the incompleteness of the tower, which is an integral part of the composition, the building is architecturally one of the most interesting churches of New York.

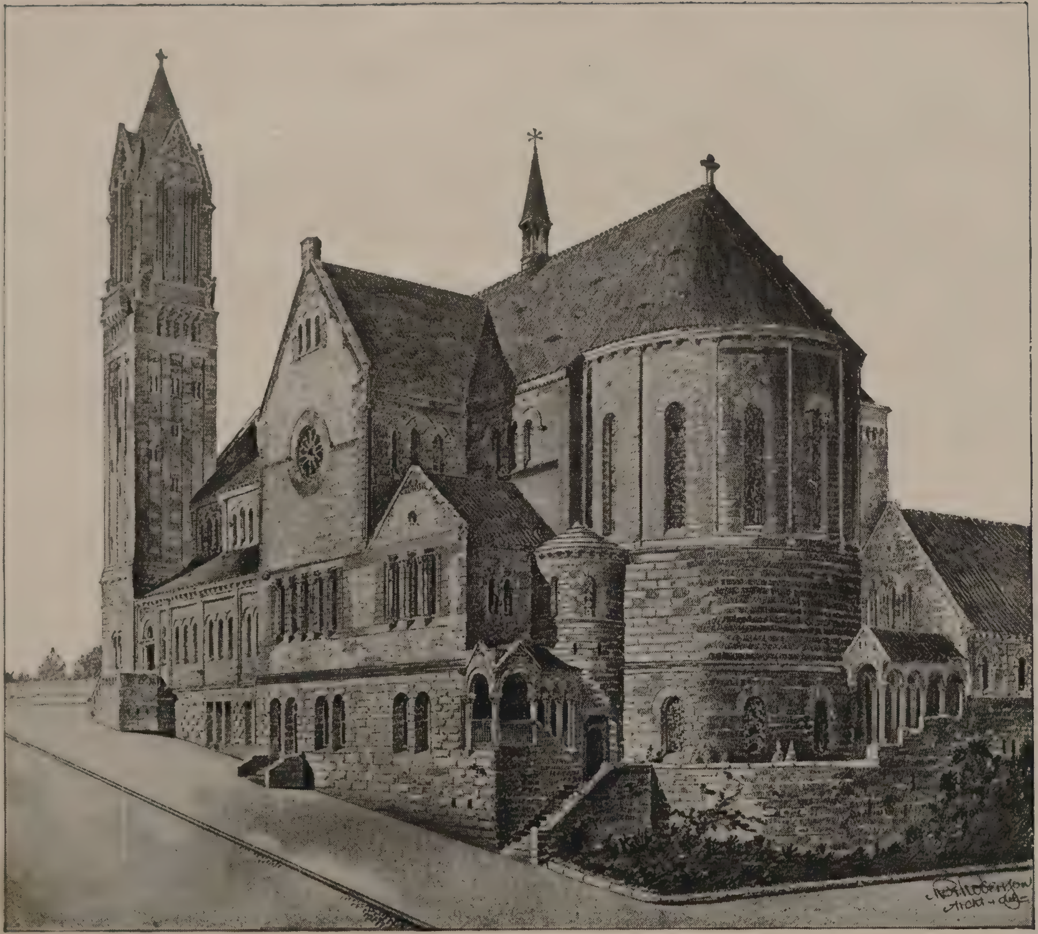
The Rutgers Riverside Presbyterian Church, although as free as St. James', and showing no more care for the praise of "correctness," is distinctly Romanesque, and is one of the noteworthy works of its author in that kind. The plan turns to architectural account the peculiarities of the site, and, as often happens where the facts are faithfully followed, converts apparently unpromising requirements into sources of effectiveness and individuality. The street corner upon which the church stands is an obtuse angle, and the church is nevertheless set upon it rectangularly, the front being perpendicular to the line of the side street. This leaves a considerable space between the avenue (the Broadway Boulevard) and the inner angle of the church, and this space is utilized by the erection here of the tower, thus well projected and detached from the church, to its considerable advantage. This detachment is nearly complete, for the space behind the tower, as far as the transept, is also reserved so as to secure the ample lighting of the interior, no matter what disposition may be made of the adjoining lot. What has been built of the tower is in general much like the base of the tower of St. James', excepting that the doorway is detailed in Romanesque instead of Gothic, while the heavy Romanesque angle-rolls of the Gothic building are omitted. In the photograph the church seems to be almost in monochrome. In fact three tints of sandstone are em-



RUTGERS RIVERSIDE CHURCH (1889).
Boulevard and 73d Street, New York City. R. H. Robertson, Architect.

ployed in it. The field of the walls is in the reddish Potsdam sandstone, while the wrought work is for the most part in the purplish New Jersey stone, in alternation with which, in the voussoirs of the arches, is used the darker brown of the Longmeadow stone. Although, if an architect's range of choice in tints were as wide in stone as it is in pigments this combination is scarcely that which he would select, its contrasts are effective. The Potsdam stone, an excellent material for use in rough masses, is too intractable for carved work, and the employment of the two brown-stones in the voussoirs forcibly expresses the structure of the arch, and to some extent supplies the place of more elaborate and more costly modelling. The front is an effective composition effectively detailed. The canopied and pillared porch at the centre, with its flanking pair of openings, makes an impressive entrance, although the entasis of the shafts is much exaggerated. The proportions and the modelling of the arch are excellent, and its effect is heightened by the mouldings and ornaments, here in pure Romanesque, well designed and well executed, as is also the carving which fills the tympana of all the door-heads. The triplet of arches above is bounded and separated by the Lombardic lisenes, here developed into complete pilasters with capitals, and supporting the carved symbols of the Evangelists. Inasmuch as the pilasters serve no purpose but to carry the symbols of an "evangelical" denomination, it seems that they would have been more effective for being detached as independent features from the wall in which they are engaged, and this, as we shall see, seems to have been the view of the architect himself in a subsequent work in which a similar feature is carried much further. In the present instance, the pilasters are neither constructive nor frankly decorative, and the front would probably be better without them, although, with or without them, it is an interesting piece of architecture. Upon the whole, however, the new flank is even more interesting, being in fact one of the most successful things we have in its kind. It is effectively framed between the turret at one end and the transept that constitutes the Sunday school at the other, and the expanse of the rough reddish wall, which would be impressive of itself, becomes much more impressive through the treatment by which it is relieved. This treatment is in a tolerably consistent Romanesque. The bays, both in the aisle-wall and in the clerestory, are divided by pilaster strips, in the former case starting from the sill course and in the plane of the wall below, so that each triple opening pierces a recessed panel framed by the projecting wall below, by the pilaster strips and by a plain but sufficient dentilled cornice. The jambs are unmoulded and the only relief to the absolute plainness is the carved blind arch of the central opening. In the clerestory, this arch is opened, and a darker stone is introduced at the impost and in the voussoirs. The difference suffices to give variety without impairing the homogeneousness of the treatment. The gabled transept at the west end is another successful piece of design. The projected porch below is one of the picturesque features which Mr. Robertson seldom fails to give us, even in buildings to which the feature does not seem to "belong." Here the feature is entirely appropriate, indeed an integral part of the composition and gains correspondingly. It is a triplet of arches in the lower story, with a central arcade of four openings above, flanked by gablets, each pierced with two arches. It is a successful piece of design, and an appropriate termination to a very satisfactory church.

St. Luke's, Convent avenue, is also distinctly a Romanesque church, and perhaps the most successful of the group we are considering, although like all the rest but the first, it suffers from the absence of the tower designed for it, and the tower is here perhaps more important as a part of the design than in the others. This building, like the last, makes a demand upon the ingenuity of the designer by one of those unusual dispositions which the architect ought to hail as opportunities, but which the commonplace architect is apt to bemoan as intractabilities. In this instance the peculiarity is the sudden and sharp decline of the ground from the front, until at the rear it is lower, by the height of a very tall story, than at the sidewalk line. The rear view is quite as important as the front, and it behooved the designer to make it worthy of its conspicuousness,as it will be agreed that he has done. The basement wall is returned at a right angle in a square and solid mass of masonry adequate to its architectural purpose of serving to spike the structure firmly to the ground and establish it in its place, a purpose which is still further fulfilled by the wing of perfectly plain wall that encloses the staircase. The upper run of this staircase and its landing give occasion for a very happy feature of porch and arcade, a reminiscence, I suppose, of the famous staircase of Canterbury. The other features that fill the space of the choir-aisle, the gabled vestry-room, if it be a vestry-room, and the attached turret, with the doorway at its base, form a picturesque huddle from which the stark-mass of the plain round apse is effectively detached and by which it is effectively relieved. The church throughout is notably severe in treatment and owes much of its impressiveness to its austerity. There is nowhere any elaborate moulding nor as yet any elaborate carving. Doubtless the capitals of the arcaded porch of the front, at present mere blocks, are meant to be elaborated some day, and the arcade of five openings in the gable to be enriched. But even so the architectural character will be that of austerity,of a building relying for its effect upon the disposition and proportion of



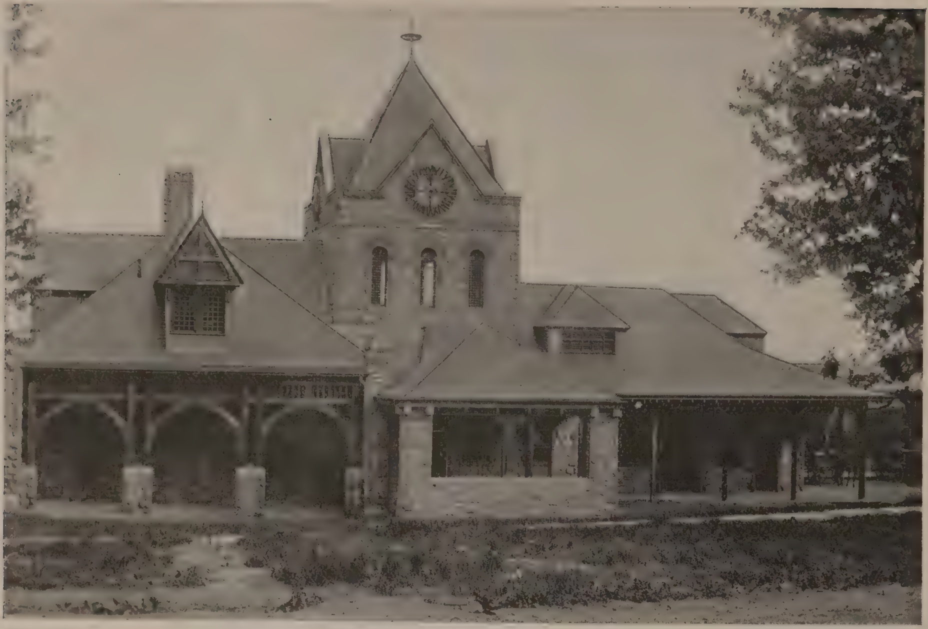
Convent Avenue, New York City. ST. LUKE'S CHURCH (1892). R. H. Robertson, Architect.

BOSTON PUBLIC LIBRARY.

its masses alone. This has been so successfully studied that the result is one of our most noteworthy churches. The difference in tint of the two stones employed serves everywhere to carry out the design and to emphasize the structure. The tower, as designed, is of the same austere character as the body of the church, a plain, almost solid shaft, buttressed only with strips after the Lombardic manner, and crowned with a belfry-stage, which is still of a monastic severity. By reason in part of the situation of the church and in part of the design, the tower is, as has been said, more necessary than in the other churches we have been considering, and it is to be hoped the parish may soon see its way to the architectural completion of the work.

I have already had occasion to refer, and shall have occasion again to refer, to Mr. Robertson's felicity in "features." An example of this felicity is his addition to the Church of the Messiah in Brooklyn of a tower, or rather of a lantern,which consists of a circular colonnade, roofed with a steep hood, and set, by means of a transition which shows much cleverness and ingenuity, upon the old and square substructure. There is no patent incongruity between the new work and the old, and yet by means of the slender elegance of this crowning feature, and of the rich porch which he also added, the designer has contrived to impart a positive and grateful architectural character to that which before was absolutely characterless and commonplace.

In these churches it is plain that Mr. Robertson has attained an individual and an interesting version of Romanesque. This is equally plain in the secular works that are more or less loosely in the same style. Of these I am compelled to put first in merit the beautiful station at Mott Haven. In this there are not only the elaborated single features which we rarely fail to find even in those of his works in which we fail to find a composition to the total effect of which all the parts contribute. We find also unity, unity in variety, and the features are parts of a physiognomy. The building and its dependencies are nearly a monochrome in red—nearly, but not quite, for common brick of a good color is used in the walls, pressed brick in the jambs and arches, red tile in the roof and red terra cotta in the ornament, and the slight variations of tint that result add life and charm to the design. There is scarcely any building more featureless than a railway station reduced to its simplest expression. It is a low shed with a sheltered platform. But then it may without incongruity have a porch, a clock-tower is especially appropriate to it, and the baggage yard may be allowed its own gate. With no other sources of variety than these an artistic architect may make a charming building, as we see here, or rather as we saw here, for the recent changes in the tracks, involving the removal of the station, have been carried out with a quite ruthless disregard of or insensibility to the merits of the work, and have destroyed or mutilated the dependencies that were integral parts of the composition. Perhaps the most successful point in the general composition is the skill with which the whole low substructure, by means of the separate treatment of its separate roofs, is grouped about the central tower and made to converge to it. But the treatment of the several features is equally happy in their general form and in their proportion, and the detail is very carefully and successfully studied in scale as well as in design. There are some happy innovations, such as the rounded soffits of the free-standing arches, but evidently nothing is done for the sake of novelty. Upon the whole this seems to me the most perfect, the most uniformly and consistently excellent, of the work the designer has yet done. If it happened, as it may have happened, that he had at the time of its design more leisure on his hands than has usually fallen to his lot since he became a busy architect, the work certainly got the benefit of that fact. One need not grudge successful architects their incomes in order to recognize that the artistic and the mercantile standards are different, and that "the hand of little employment," whether or

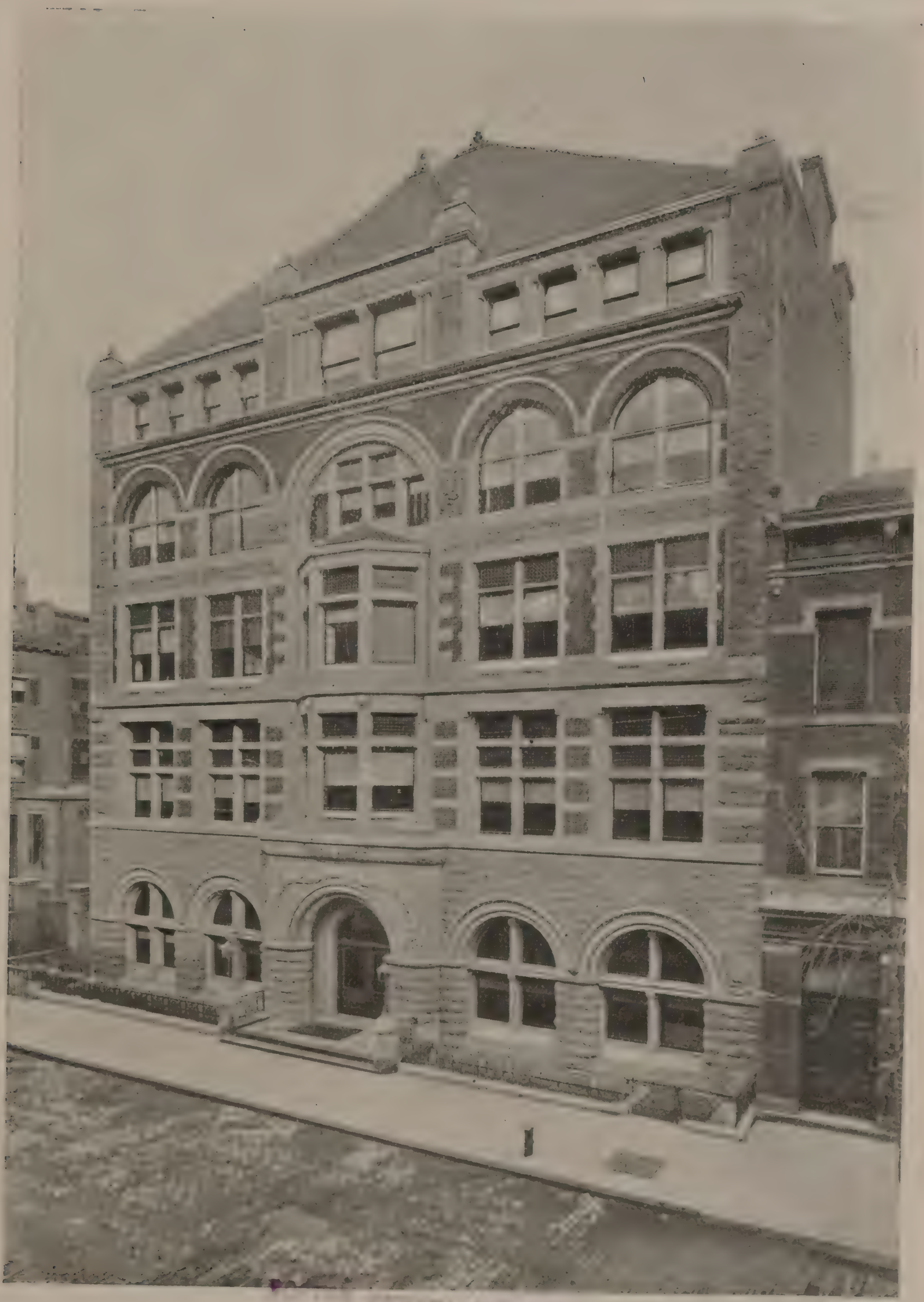


NEW YORK CENTRAL STATION AT CANANDAIGUA (1888).
R. H. Robertson, Architect.

not it "hath the daintier sense," which Shakespeare attributes to it, has necessarily the more careful touch.

There is another station, at Canandaigua, which is noteworthy as showing in a much simpler and less elaborated form, the essential merit in composition of that at Mott Haven, that is to say, the harmonious subordination of the rest to the dominant feature. This seems to me to have been the essential merit of Richardson's design, which the present work recalls. This recalls it more obviously in the choice of the Richardsonian combination of material, though it does not show the tremendous exaggeration by which Richardson so emphasized the point of his design that the wayfaring man could not miss it. Apart from all that, the wayfaring man of a cultivated mind cannot come upon such a piece of work as this at a country station without feeling gratitude to its designer.

An earlier work than the Mott Haven station, and perhaps a more conscious and deliberate essay in historical Romanesque, is the Young Women's Christian Association in Fifteenth street, an interesting application of the style to a modern street front. One of the things to be kept mainly in view in a situation in which the architect cannot command his surroundings, is the desirableness of conformity, and in the shiftings of New York this involves conformity not only to what exists, but to what may probably come to pass. This is a duty of what may be called artistic civism, and Mr. Robertson seems to me to be noteworthy and laudable for the extent to which he keeps it in mind. In some European cities it is enforced by public authority, but in American cities there is no compulsion to it except what the designer voluntarily imposes on himself. The present front "will go" with anything that a civilized designer is likely to adjoin to it. It is a symmetrical, decorous and well-behaved composition, with a massive basement, a well lighted superstructure, of which the lightness does not threaten the stability, and an effective colonnade by way of attic under a visible roof. The massiveness of the basement seems to be obtained at some

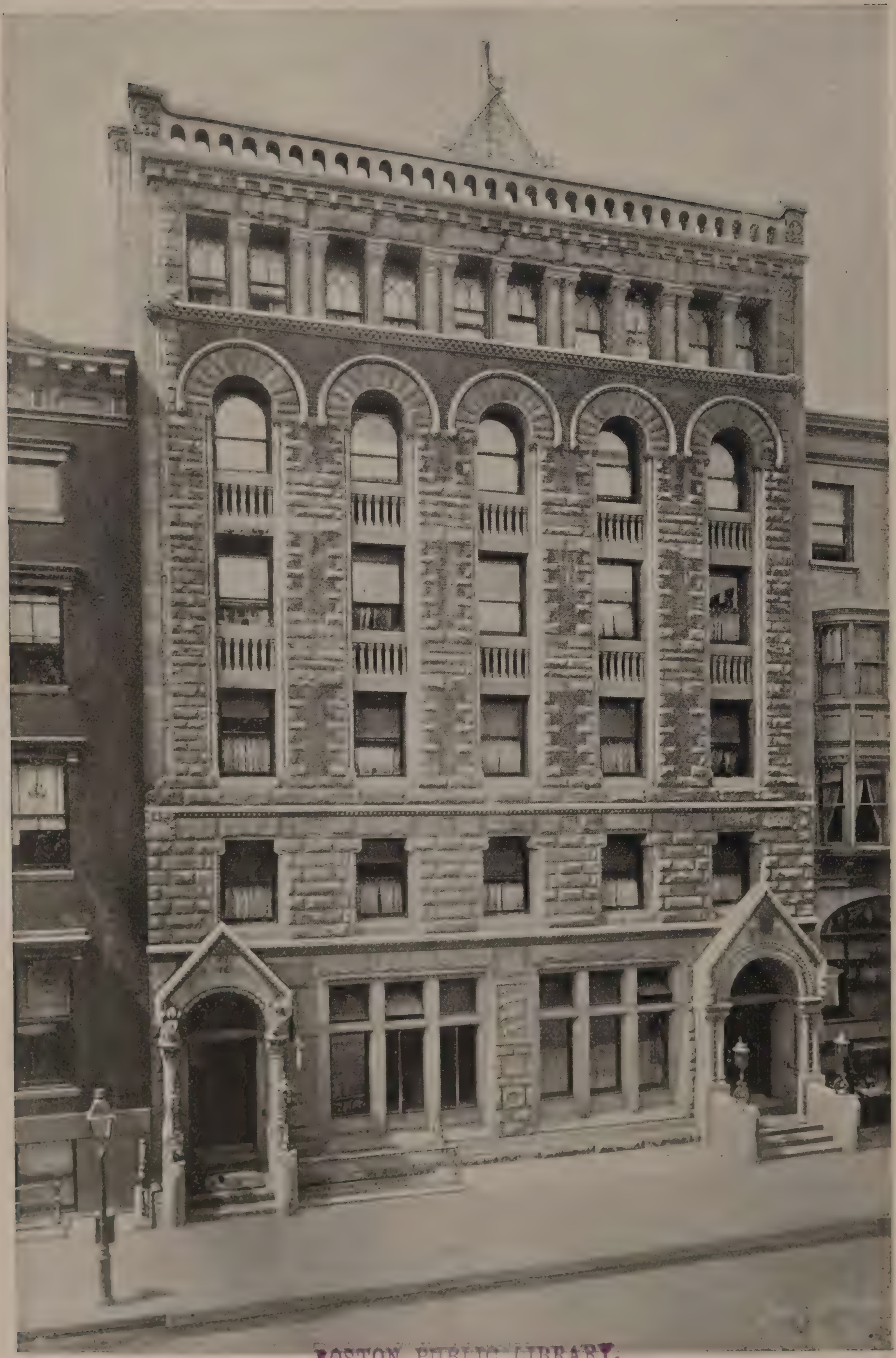


PUBLIC LIBRARY

YOUNG WOMEN'S CHRISTIAN ASSOCIATION (1883).

Fifteenth Street, New York City.

R. H. Robertson, Architect.



BOSTON PUBLIC LIBRARY.

MARIA LOUISA HOME.

East 16th Street, New York City. R. H. Robertson Architect.

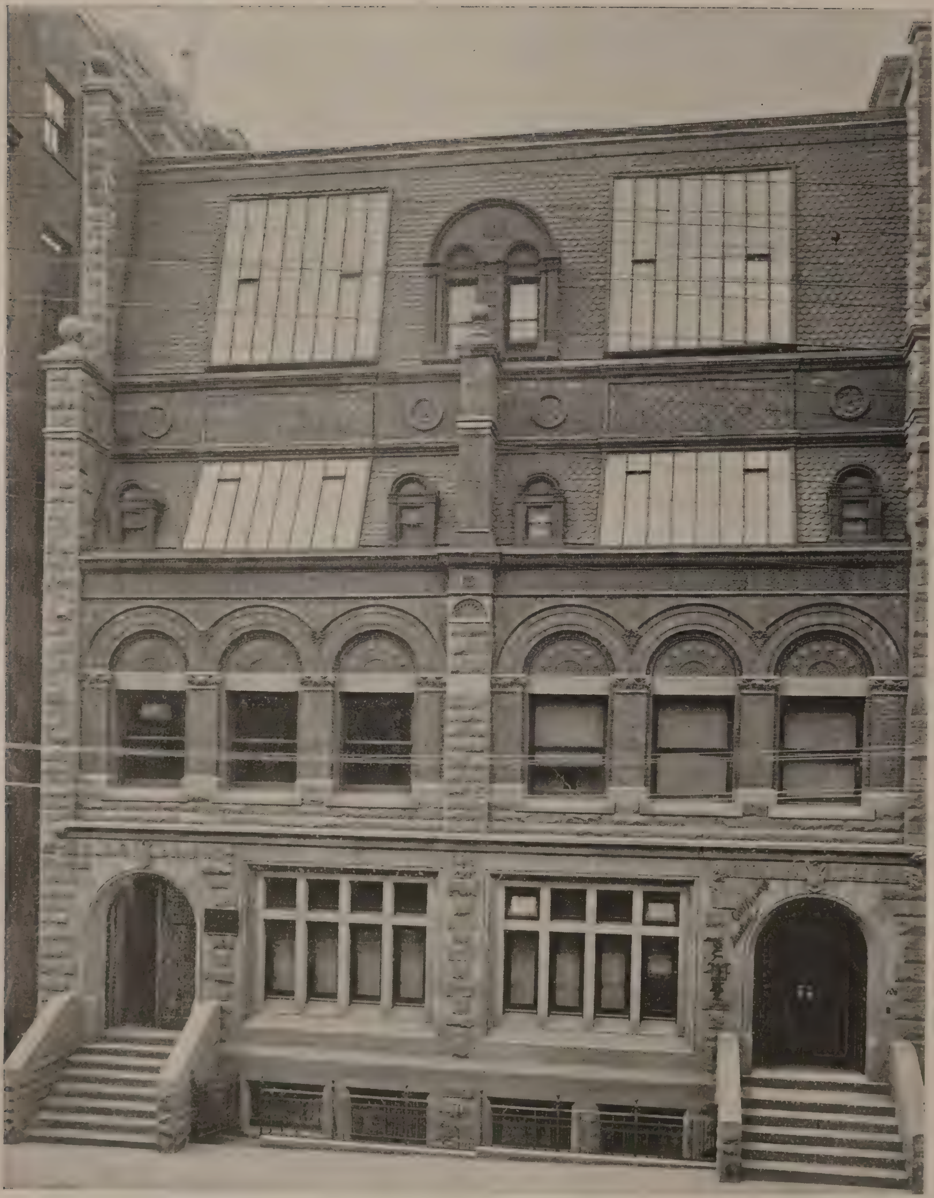
sacrifice either of expression or of practicality — where does the floor line come?—but in the superstructure there is no suggested sacrifice in either direction. The central feature is an effectual safeguard against monotony, without being excessive, and upon the whole the building is an exemplary street-front. Much the same may be said of the counterparting front on the street in the rear, which is very properly, less institutional and more domestic of aspect. The front, however, has an emphatic triple division, the construction is expounded throughout in the design and the whole is relieved from commonplace and receives a touch of picturesqueness through the colonnade at the top and the well-detailed porches.

That is, however, a distinct infelicity in the design by which the piers that run through four stories are aligned in whole or in part over the openings of the basement. Plainly either they should have had visible means of support in still more massive piers below, or else the whole basement should have been of such massiveness as to count, with reference to the superstructure, as a virtually solid wall.

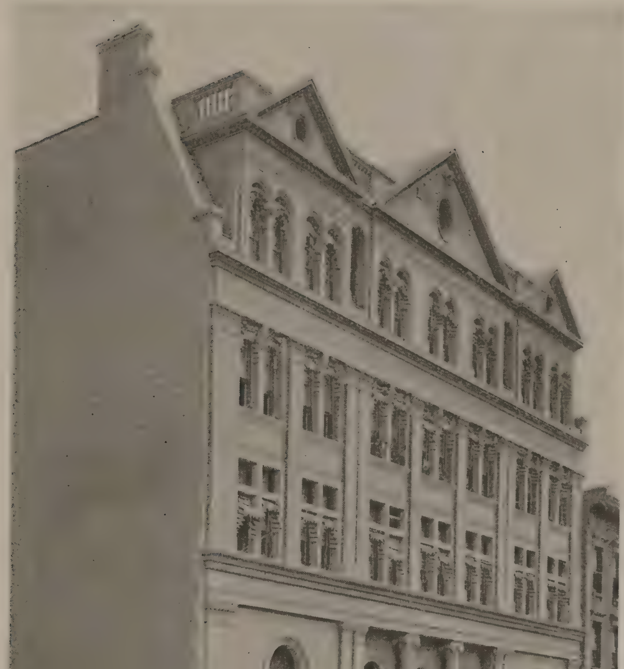
The Railroad Men's Building, at Forty-fifth street and Madison avenue, is an interesting and picturesque structure, in the nature of a club house. The nearly square corner building is the centre of a composition which has now been completed by an extension on the street, corresponding to and more or less balancing the extension on the avenue front shown in the illustration. The general treatment of the building is plain. It owes its effect, which is very good, first to its general disposition and picturesque outline, next to the successful adjustment of its voids and solids, and then to its effective combination of color. A superstructure of tawny brick for the field of the wall, with red brick and red terra cotta for the emphatic fronts of structure, surmounts a basement of red Scotch sandstone and is surmounted by roofs of varnished brown tiles. Ornament is sparingly introduced, but always at the right place, in the right quantities, and of notably good design. Mr. Robertson has done nothing better in its kind than the canopied doorway with its rich reeded pier and decoration in terra cotta, and the equally rich and spirited carving of the stone buttresses of the "stoop."

Undoubtedly by the same hand is "The Holland," at Broadway and Forty-fifth street, a three-story building which, by its modest altitude, denotes that it is a provisional structure, meant to last only until a more definitive disposition is made of the ground on which it stands. This is not suggested by the architecture, which seems substantial enough. The combination of color is the same as in the previous building, and the building derives picturesqueness from the emphatic projection of the varnished roofs over the walls and from the belts of shadow thus secured. The "feature" is the entrance to the upper floors at the centre of the front, a rich and baroque construction of a round pediment in terra cotta upon a pair of plain piers, that suggests a Batavian origin. Although the building seems out of place where it stands, one would be very glad to meet it, barring the painful attenuation of the angle pier to an iron post, in a suburb or an inland town to the permanent conditions of which it conformed. Of course the tenuity of the angle is not to be imputed to the designer, being the result of a commercial demand.

Another unusual type is what is now known as the Studio Building in West Fifty-fifth street, but was originally erected for the Mendelssohn Glee Club, to which the rent-paying studios were merely a preface. But the preface prevented the signalization in the architecture of the primary purpose of the building, which was in fact indicated only by a sign over one of the two equal entrances. Externally the building, as it was designed and built, was a studio building only. The front is of only fifty feet, though it looks very much longer, thanks to the emphasis put upon the horizontal lines, even though it is divided at the centre



West 55th Street, New York City. STUDIO BUILDING (1885). R. H. Robertson, Architect

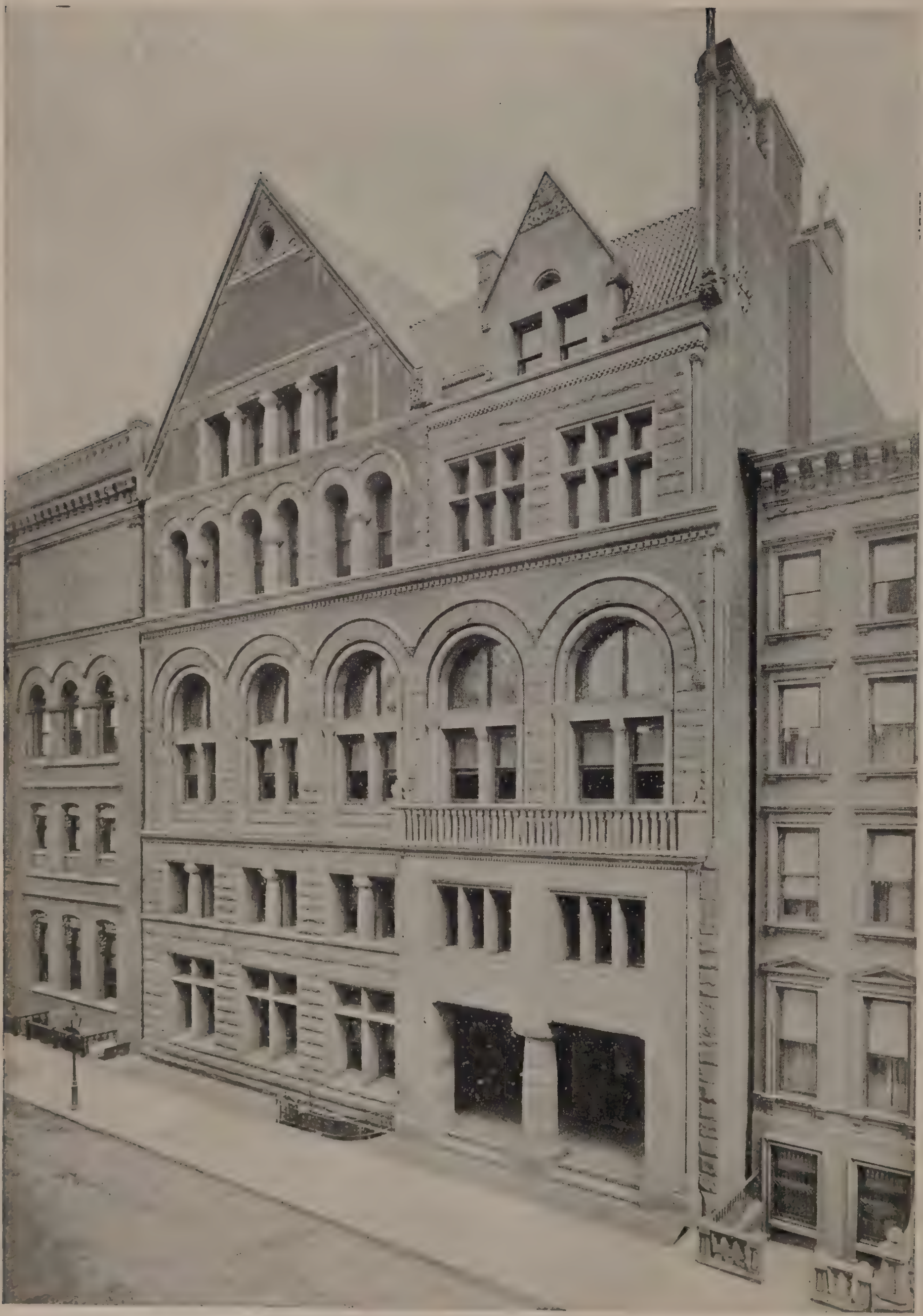


BOSTON PUBLIC LIBRARY

MENDELSSOHN GLEE CLUB (1892).

West 40th Street.

R. H. Robertson, Architect.

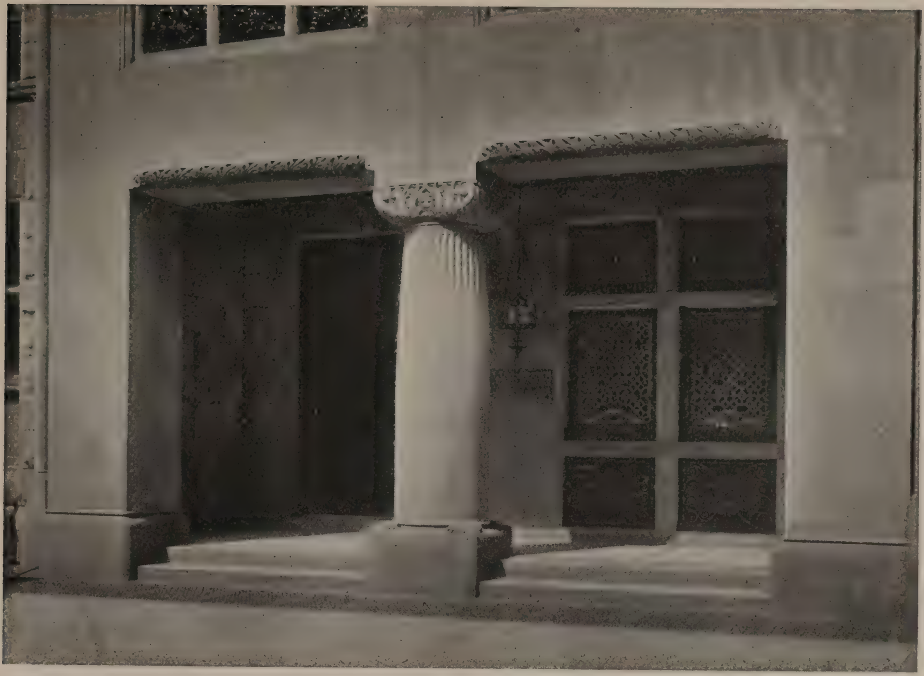


ACADEMY OF MEDICINE (1889).

West 43d Street, New York City.

R. H. Robertson, Architect.

[illegible] PUBLIC LIBRARY.

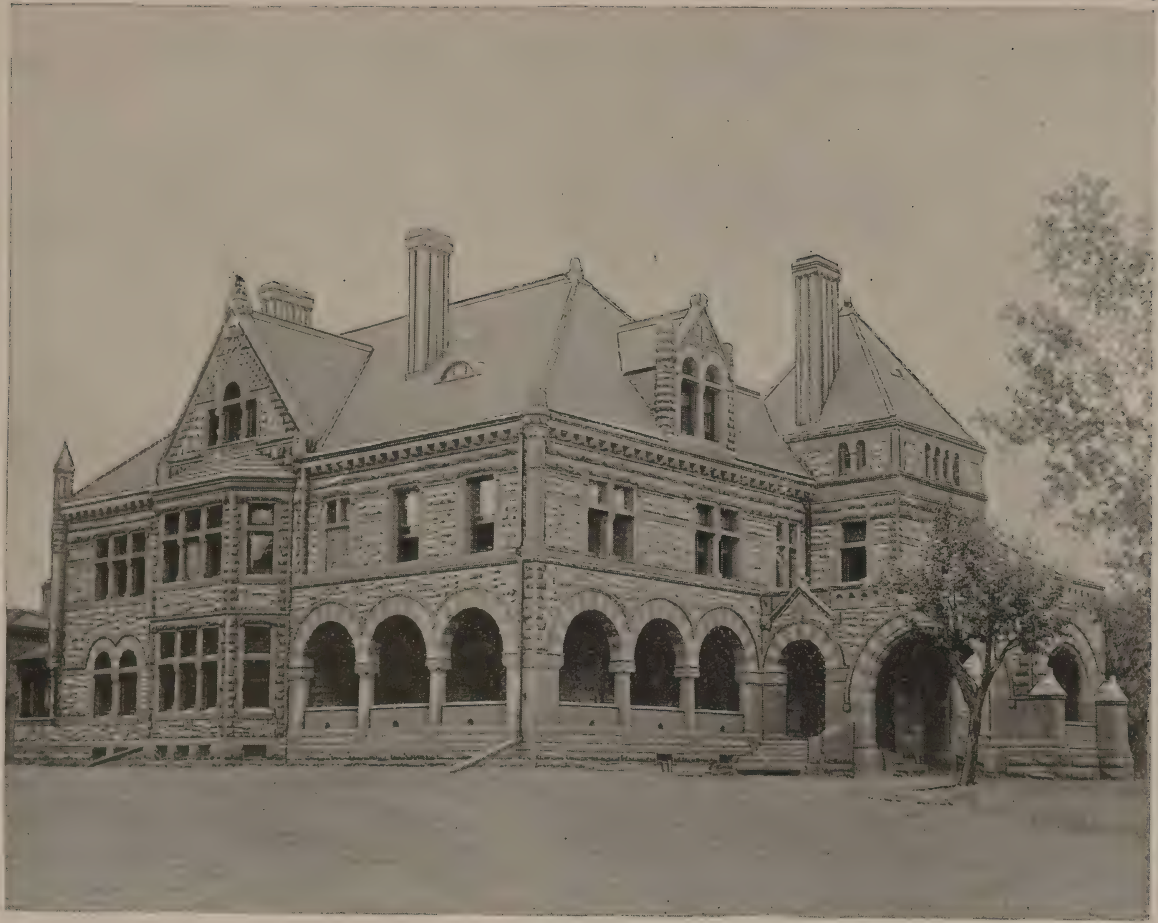


ENTRANCE, ACADEMY OF MEDICINE (1889).
R. H. Robertson, Architect.

by a strong vertical line, apparently the emergence of a party wall. The wall is but of two stories, the remaining two being in the roof. The unusual disposition gives the building great quaintness, though it is evidently not sought for that purpose,and indeed explains itself to every passer. The treatment is perfectly straightforward and logical, a stone basement, a middle term in brick and terra cotta, and a tall roof in red tiles and glass, nearly as tall as the whole substructure, in two pitches to accommodate two tiers of studios, and with a band between them enriched with ornament in terra cotta. The triple division is very strongly emphasized by the change of material and the radical change of treatment, which, moreover, is evidently not arbitrary but the result of a straightforward and idiomatic following out of the nature and capacity of each material. In a line drawing it would be as plain as in the photograph or the fact that the basement was of stone, and the middle story in baked clay and the roof in slate or tile, with features and ornaments in terra cotta. The perfect naturalness of the treatment gives much of its charm to this unpretentiously picturesque street-front.

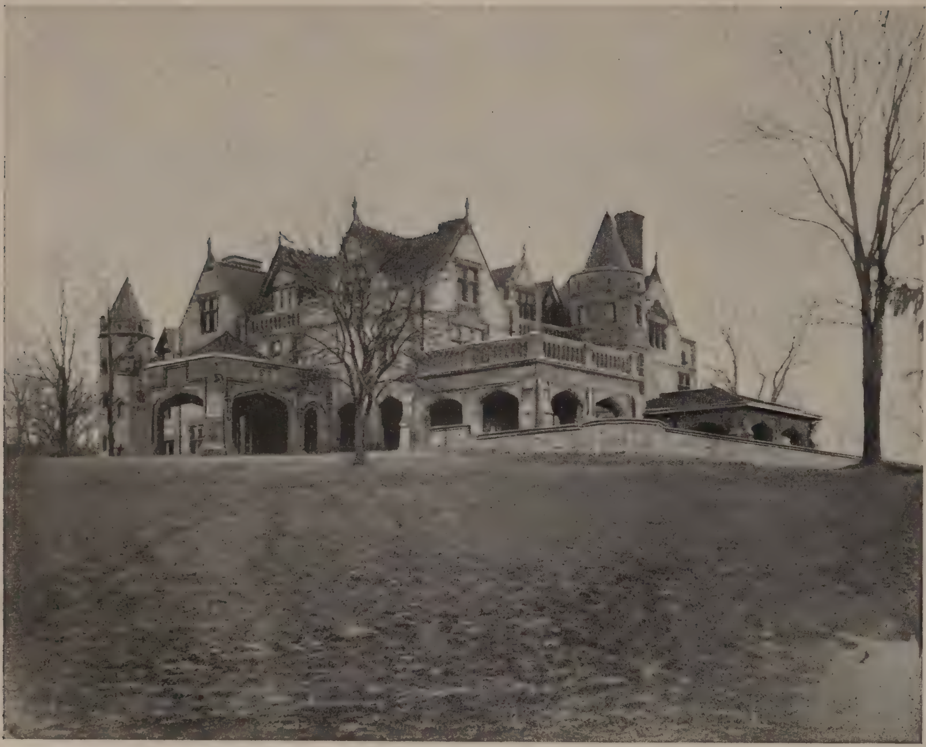
A very much more important work is the Academy of Medicine in Forty-third street. It must be owned that the interest here is in the parts rather than in the whole, that the features, interesting as they are in themselves, do not make up a physiognomy. In the first place the front, but that it has only a single entrance, would indicate two buildings rather than one. This separateness seems to be sought and is certainly emphasized. The three pairs of arches under the gable,for example, are not only not repeated along the adjoining wall, where they are succeeded by two lintelled and mullioned windows, but a change of material enforces the change of treatment, a field of rough brownstone succeeding the field of red brick, and the dormer that crowns the lateral wall having no counterpart in the wider front. Hide the front below the cornice over the great arcade, and you will say unhesitatingly that it is the front not of one building but of two,designed it is true, so as to help each other, and in conjunction,but by no means parts of one whole. The one continuous feature is the big arcade, of which the three openings to the left are quite congruous with the front in which they stand, but the two to the right are plainly excessive in scale and exaggerated in treatment for the front to which they belong. Indeed this exaggeration is the chief fault in the design of the narrower front considered, as one must consider it, by itself. Moreover, the arcade loses much of the impressiveness to which its scale and design entitle it, by the lack of abutment. In order to give it assurance of stability it should be framed between massive flanks of wall rather than these terminal piers, which, quite adequate for an ordinary front, are quite inadequate as the ultimate abutments of an arcade that exerts so powerful a thrust. Mr. Richardson's instinct for structural expression frequently failed him at this point, and made him indifferent to the visible abutment of his tremendous arches, although it is not only demonstrable but obvious that the more powerful an arch with insufficient abutment the weaker is the construction. The effect of the arcade here is still further weakened through the cutting of the bases of two of its openings by the balustrade of the porch. The main defect of the design is a defect of unity. The front is neither single nor twofold, and the architect must, we think, be convinced by the contemplation of the completed front that the impulse which led him to divide it in design was a mere caprice. The successes are successes of detail, rather of features, and how good the features are. The porch is of a more than Romanesque,of an Egyptian massiveness, and, with the background of solid shade secured to it by its own projection and still more by the recession of the wall behind it, is a very telling feature. Such carving as it bears is excellent, though a greater quantity would have protected the porch from the criticism that its massiveness degenerates to rudeness. The single pillar is powerful, though the entasis is much exaggerated, as is the case with the attached columns throughout, and entails an unfortunate effect. Another feature is the treatment of the narrower front above the arcade, that formed by the pair of mullioned windows and the heavy dormer. Another is the main gable, in which indeed the relation of the three pairs of arched openings to the quadruple colonnade leaves something to be desired, but which has spirit and picturesqueness, and in execution derives a singular charm from the contrast with the stone of the mellow and velvety brickwork.

I have used up so much of the space to which I am limited in talking about Mr. Robertson's work in Romanesque that, while that phase of his work is by no means exhausted and interesting examples of it have been passed over altogether, there is very little room left in which to speak of the other phases. But I am the less sorry for this because the Romanesque, or at least the Romantic, phase of his design seems to be so much the more characteristic and important as to constitute artistically the bulk of his work. Of course it is idle to quarrel with any individual architect for "keeping up with the procession" and changing his style when it is clear that the fashion has changed. Fatal to architectural progress as these capricious changes may be and are the individual architect who merely submits to them is to be commiserated. He has always ready for his critic the trite plea of the French criminal, and the critic cannot fairly repeat the retort of the French judge. Certainly the present critic does see the desirableness of his subjects survival and continued practice of architecture, in whatever mode may be *the* mode. But then Mr. Robertson's Romanticism is so inveterate, and the characteristic of his best work is so



Springfield, Ohio. FRONT VIEW, RESIDENCE OF A. S. BUSHNELL, ESQ. R. H. Robertson, Architect.

BOSTON PUBLIC LIBRARY.

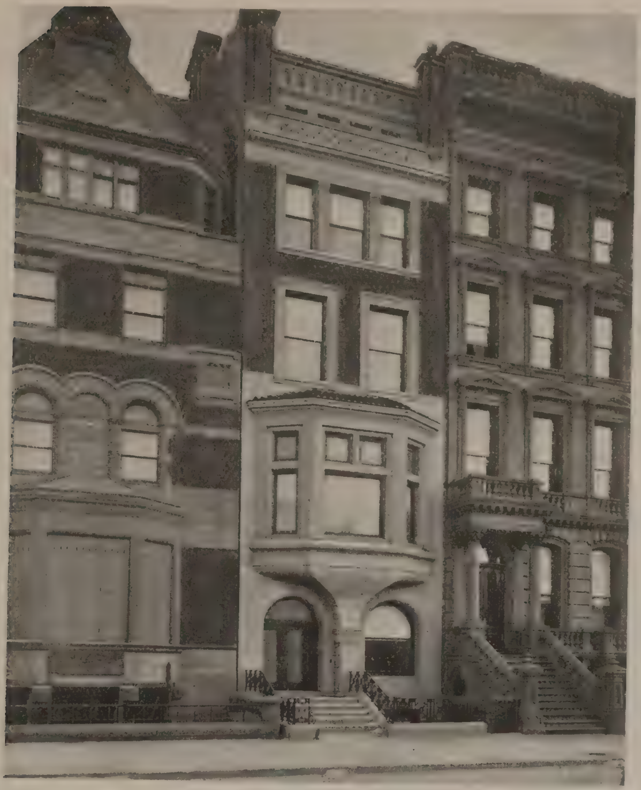


DR. WARNER'S HOUSE (1896).

Irvington, N. Y. R. H. Robertson, Architect.

evidently picturesqueness, even when it becomes a rather random picturesqueness, he is so much more at home in free architecture that it is a distinct loss that he should have felt constrained to "follow a multitude to do" classic. The loss is the greater because his free and eclectic version of the mediaeval styles shows, upon the whole so steady an advance in the sobriety and restraint which it is the more necessary that an architect should impose upon himself when it is not imposed by his style. Take for example the Romanesque house at Springfield, Ohio, and the large country house at Irvington, which is distinctly composed in late English Gothic, and of which the main merit is the unity of the composition and the subordination to the total effect of the picturesque features for which one very seldom looks in vain in Mr. Robertson's work. Another country house at Irvington is less extensive and elaborate, but not less successful, although the ample music room seems to have been appended as an afterthought, and does not properly form part of the design. This is one of the characteristic American successes in which a work that is of no style yet has style.

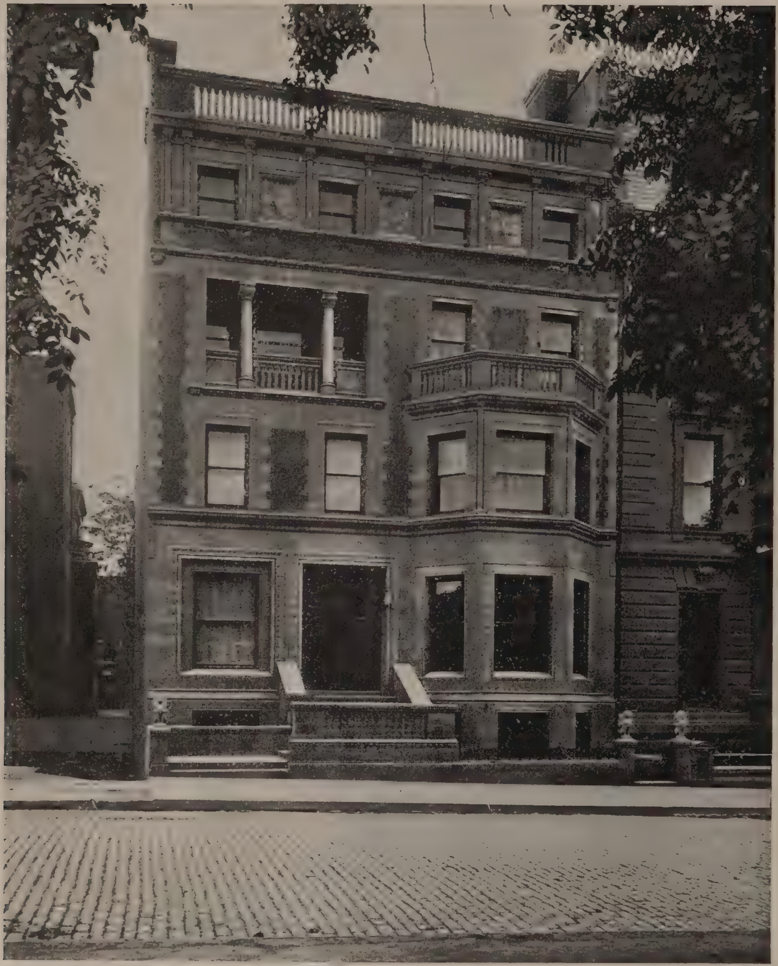
This is the merit of a number of town houses that Mr. Robertson has done, of which some that it is not feasible to illustrate here are as significant and successful as those that are shown. A house-front in a row is a difficult problem, because in this also the architect must conform not only to his actual surroundings, but to what his surroundings are likely to be. A "purple patch" of picturesqueness that seems to hold up its neighbors to public odium is a piece of incivism from which one gladly turns to an example of dull decorum. The twenty-foot front in Fifth avenue, herewith shown, is a



Fifth Avenue, New York City. PRIVATE RESIDENCE R. H. Robertson, Architect.

case in point. The decorum of this indeed does not become dullness. It is a well-composed, harmonious front that is none the less worth looking at because it does not force you to look at it. What makes it especially pertinent and exemplary is that it replaces an aggressively picturesque front by the late Wrey Mould in particolored Victorian Gothic, which many New Yorkers will recall. Of course this was not without interest in itself, but it was so evidently "unneighborly" that it is no wonder the owner found it a social duty to replace it with something less importunate. The same praise of conformity and decorum belongs to the dwelling in Fifth avenue, near Sixty-eighth street, and to other dwellings by the same architect in upper Fifth and upper Madison avenues. If one can add a touch of picturesqueness without disturbing the air of peacefulness and good neighborhood which is the first essential of a town house, all the better, but he incurs a certain risk in the attempt. Mr. Robertson has several times ran the risk and escaped with impunity, notably in the design of two dwellings in West Fifty-fourth street, of which one in particular, No. 50, is especially exemplary as showing how a piece of domestic architecture, which is only a street-front, may respect all the conditions and relations of its place and yet be an individual and charming work.

As might be inferred from his work in the romantic styles, Mr. Robertson's work in classic is extremely free and does not solicit the praise of purists. The only academic piece of classic he has essayed, I think, is a tomb at Irvington, which is as studiously and consciously "correct" as if in designing it

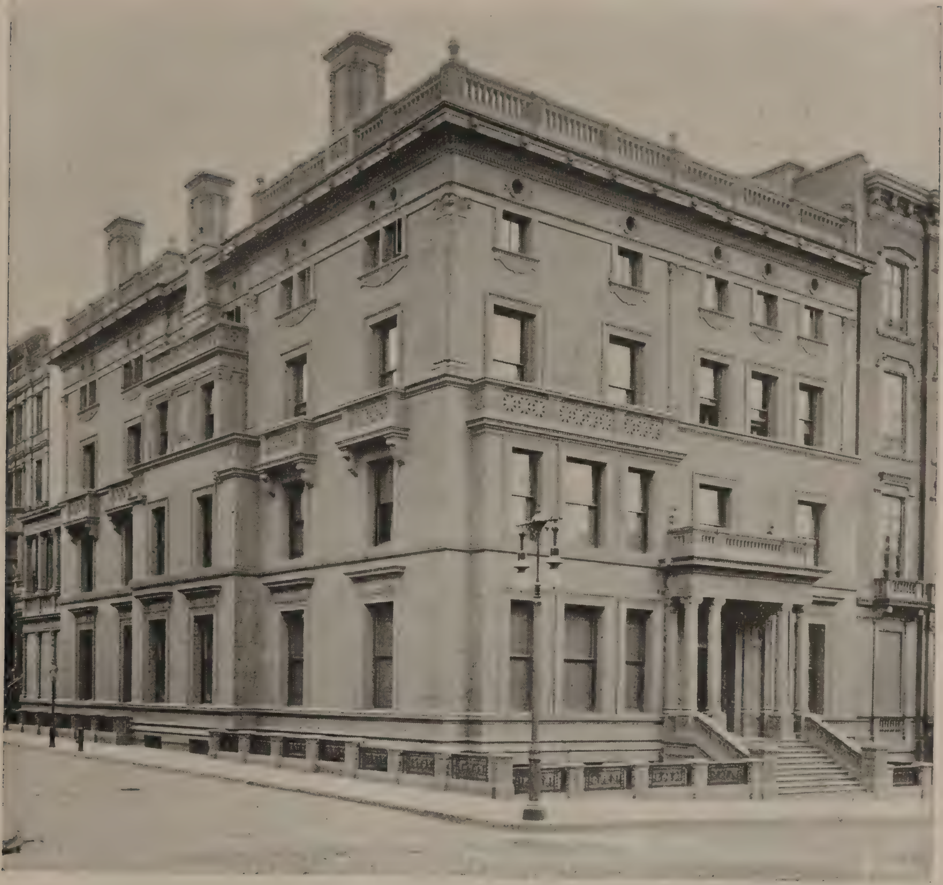


MR. [illegible] INMAN'S HOUSE.

Fifth Avenue, New York City. R. H. Robertson, Architect.

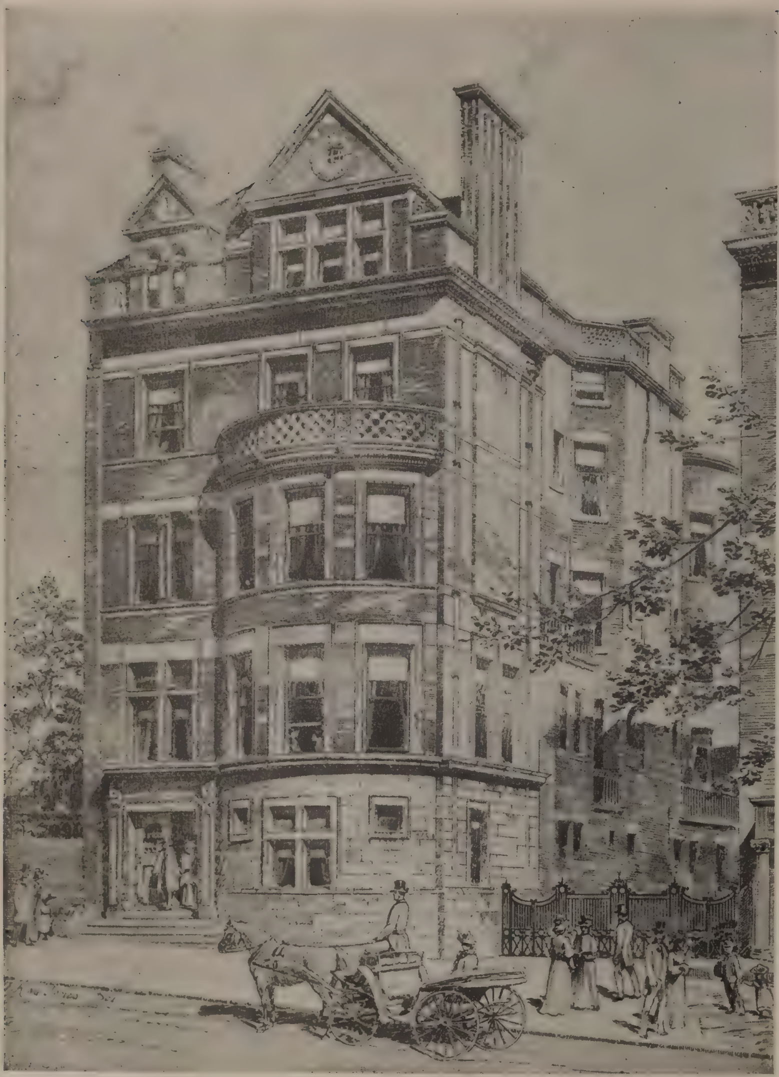
the author had had a professor [illegible] mind, and which is a very successful essay in its kind, successful that is [illegible] say in the adjustment and the scale [illegible] forms and details all settled for the designer beforehand. Another work [illegible] consciously classic, the Savings Bank in Ninth avenue, is not quite so successful, because here the consecrated forms had to be adapted to practical requirements. The portico, taken by itself, is an "example," but the longer side lacks not only formal symmetry, but artistic balance, and the skylighted dome does not so dominate the building as to account for and justify the transeptual arrangement. It is pretty evidently either too important or not important enough.

Of course in these things the manifestation of individuality is not to be looked for. Where he has permitted himself more freedom, however. Mr. Robertson has succeeded in imparting [illegible] distinctly individual character to his [illegible] designs. This is eminently the [illegible] with the building of the United Charities in Fourth avenue, and the building of the Mendelssohn Glee Club in West Fortieth street. Though there are few specific resemblances in the detail of the two, nobody who had



CHAS. T. YERKES' HOUSE (1896).
Sixty-eighth Street and Fifth Avenue, New York City. R. H. Robertson, Architect.

seen both could doubt that they were the work of the same architect. In each case the building seems to have been planned according to its requirements, and the classic detail employed to garnish the disposition arrived at by this manner of design. This was the method of the free classic building in Germany, France, England, everywhere, indeed, out of Italy. It entails, indeed, a complete sacrifice of purity, and this in a wider than the scholastic sense, but it offers in compensation a homely picturesqueness and an unsought quaintness that are not without their charms. This attraction these buildings have and it is perhaps enhanced by the fact that their composition, while it is coherent, is highly irregular. The United Charities is unmistakably an office building, in which there is no sacrifice of the practical requirements, but which nevertheless has an architectural interest, by reason of such features as the ample entrance, the order that embraces the upper stories, and the spreading dormer gables of the roof. The Mendelssohn Glee Club, on the other hand, suffers from the fact that the front of two stories, corresponding to and indicating the floor and gallery of an ample auditorium, is surmounted by three stories of rentable apartments, which are much too important to be regarded as a mere appendage of the principal apartment,and which are not, and perhaps could not be, architectur-

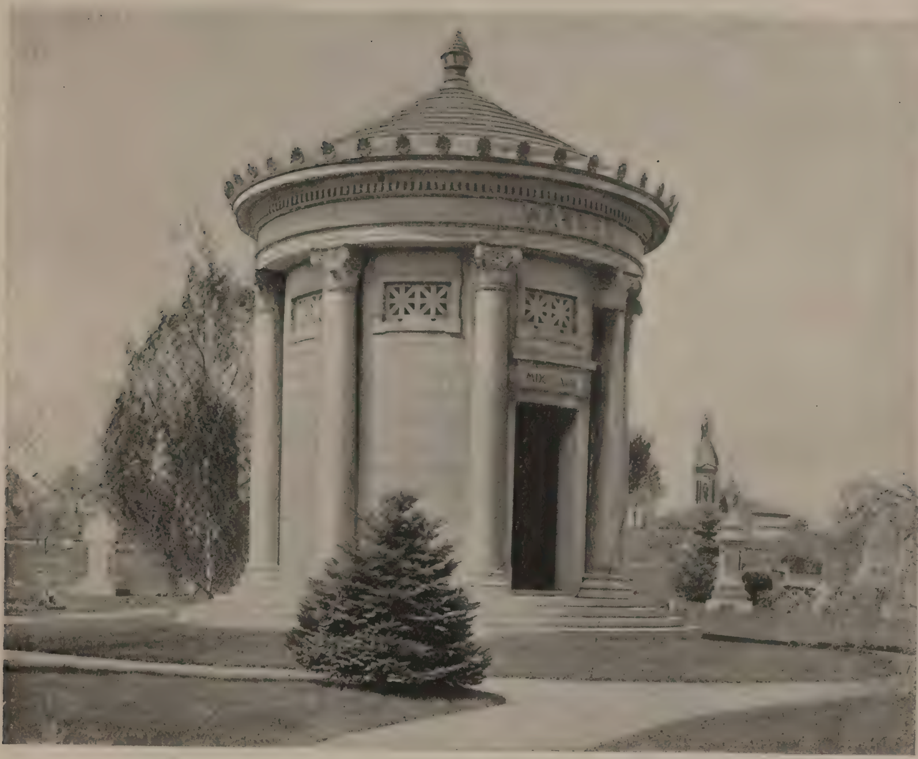


RESIDENCE, THOS. A. MCINTYRE.

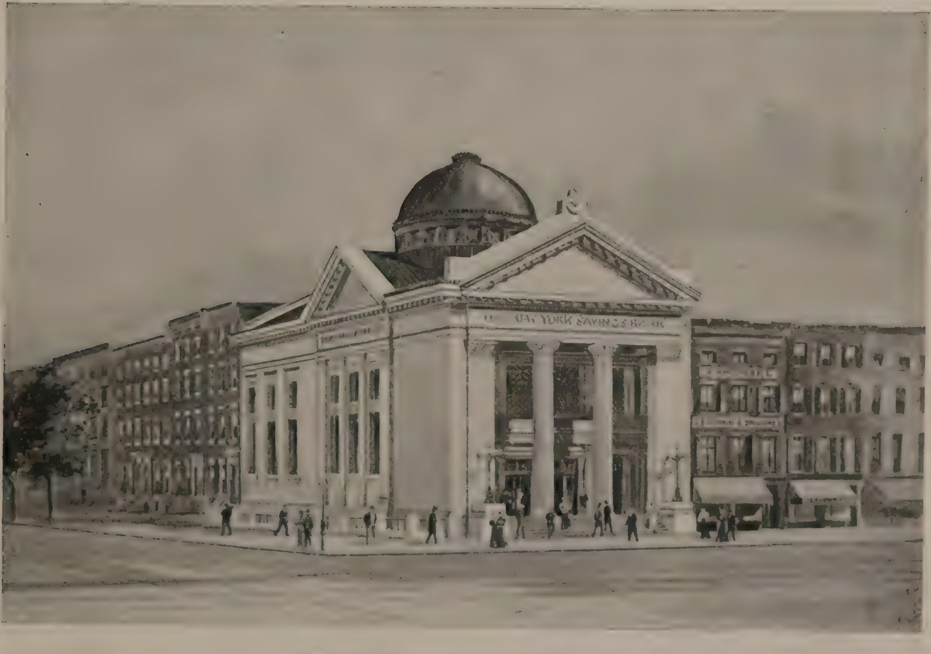
West 75th Street, New York City. R. H. Robertson, Architect.

ally incorporated with it. It will be agreed that the music-hall, taken by itself, is a very successful performance, and that, if it had been commercially practicable to omit the two interpolated and architecturally irrelevant stories, and set the roof duly modified, above the second story, the result would have been an extremely attractive and individual front. It is such a front, though its merits are somewhat obscured by the superincumbent offices, a harmonious, dignified and expressive composition.

An extreme example of free classic in ecclesiastical work is St. Paul's (Methodist) Church, not yet completed, in West End avenue, built in buff brick and terra cotta of a fortunate irregularity of tint. The architecture of this bears something the same relation to the more common classicality of classic churches as the "Jesuit style" to the more formal Renaissance. It



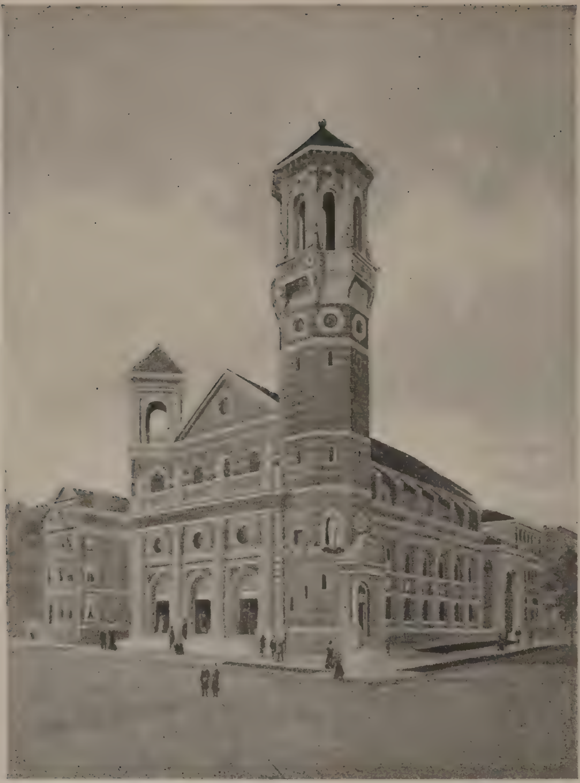
rvington, N. Y. WARNER TOMB (1895).



THE NEW YORK SAVINGS BANK.

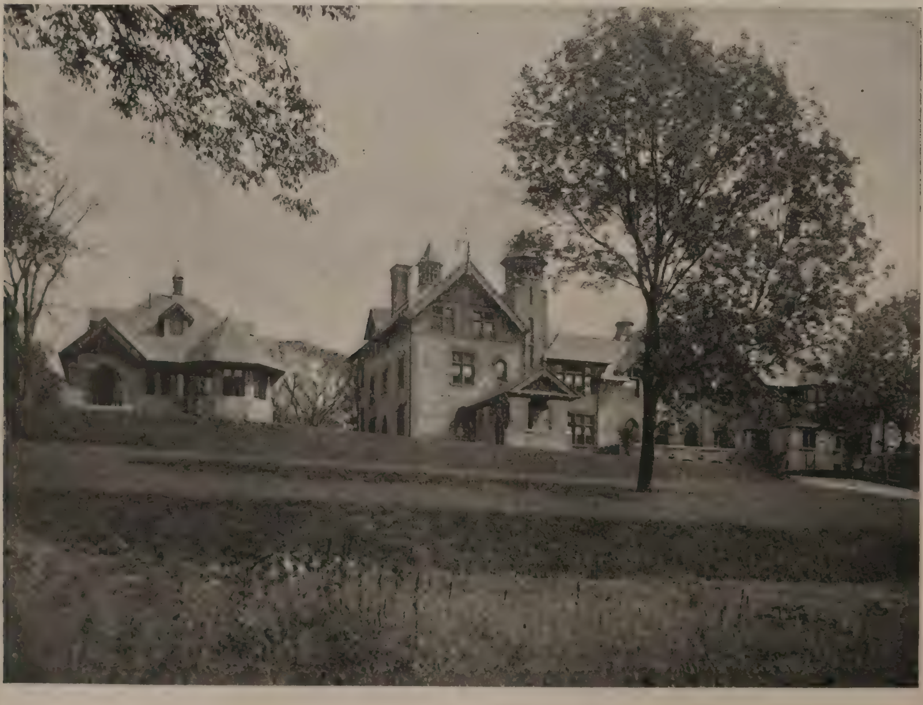
Fourteenth Street and Eighth Avenue. (Now Building.) R. H. Robertson, Architect.

BOSTON PUBLIC LIBRARY.



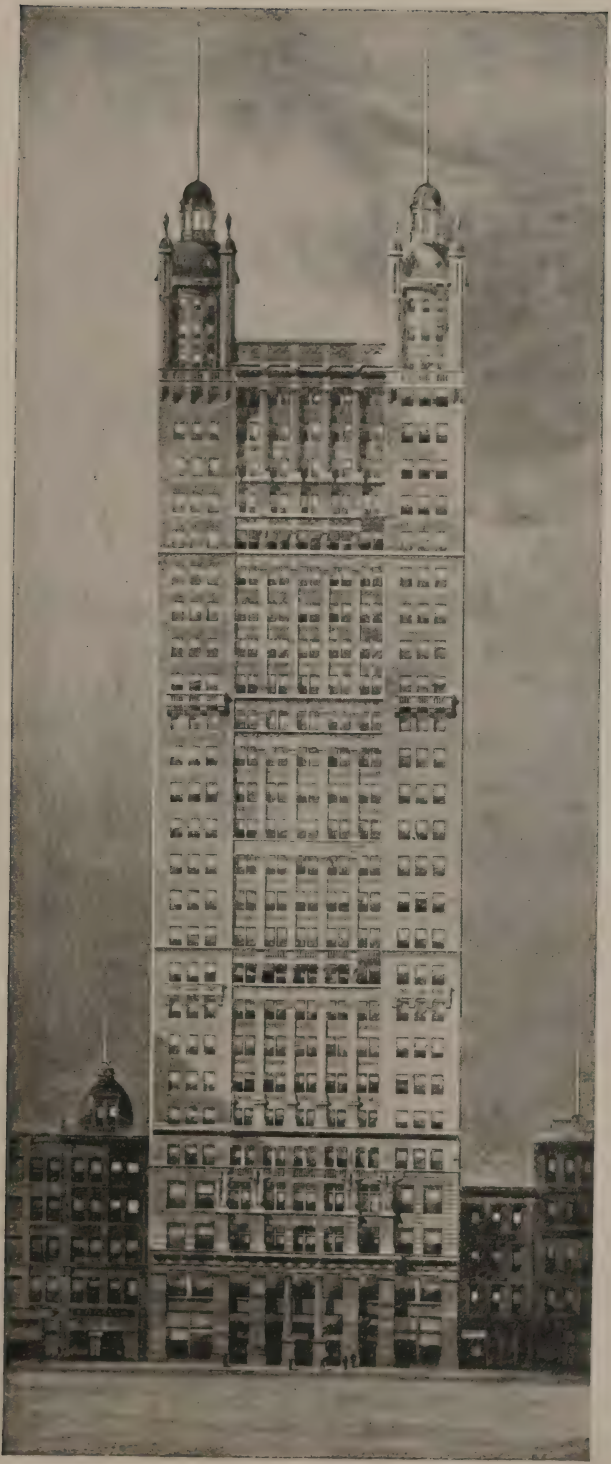
ST. PAUL M. E. CHURCH (1896).

86th Street and West End Avenue, New York City. R. H. Robertson, Architect.



RUTGERS RIVERSIDE CHURCH (1889).

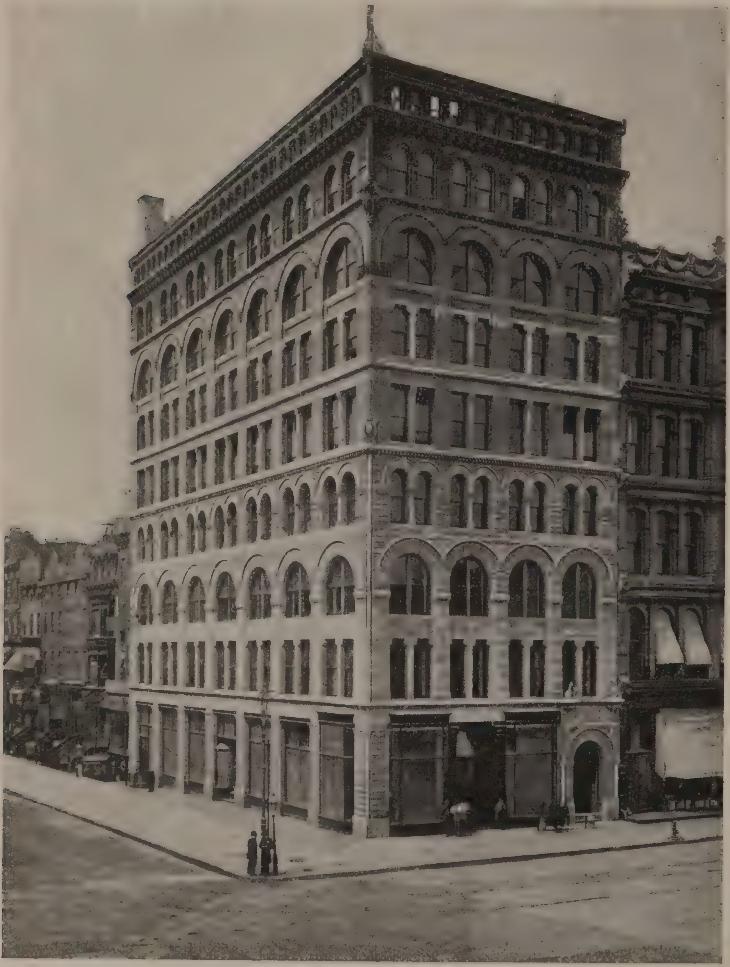
Yonkers, N. Y. R. H. Robertson, Architect



New York City.

PARK ROW BUILDING.
(Now Building.)

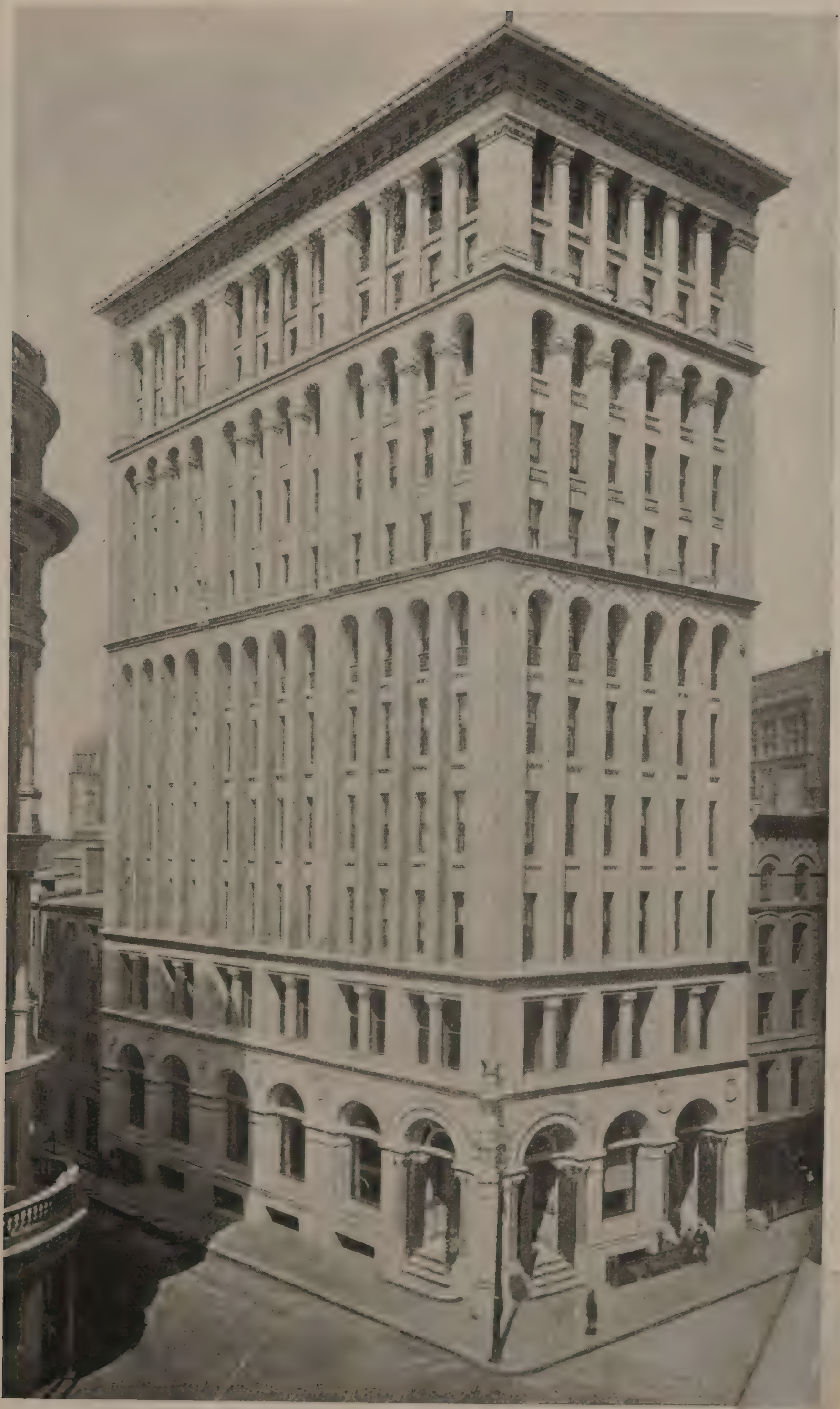
R. H. Robertson, Architect.



LINCOLN BUILDING (1885).
Fourteenth Street and Broadway, New York City. R. H. Robertson, Architect.

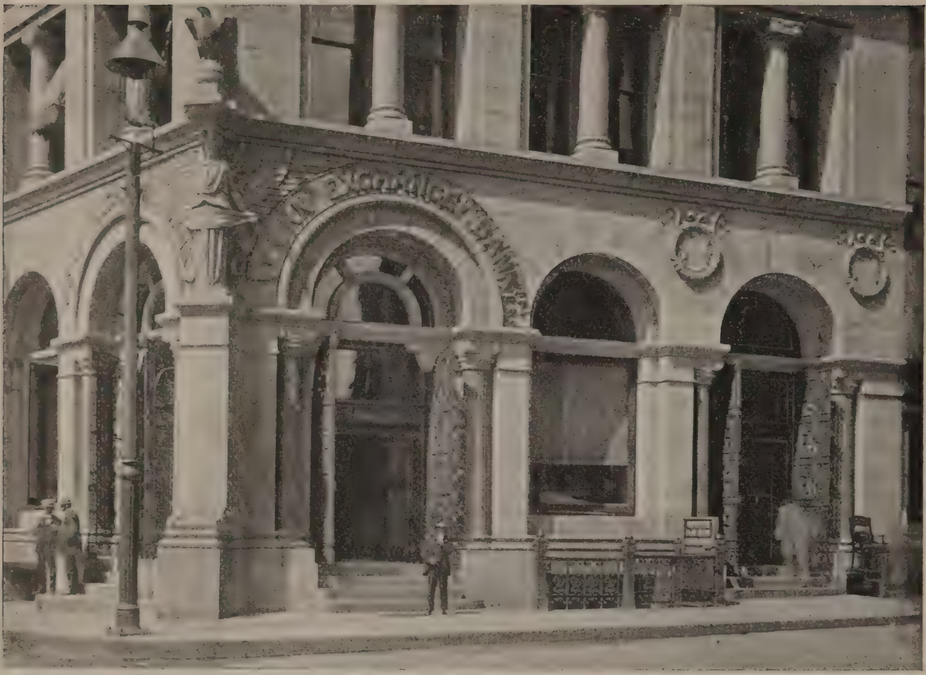
is, if I may so say, unscrupulously picturesque, and not unsuccessfully so, although in fact the plain and powerful flying buttresses of the clerestory give a much greater sense of structure and stability than in the illustration, a sense which is by no means increased by the treatment of the outer buttresses, not as lateral supports, but as upright pilasterys. The porch shows the same motive of four crowned pilasters as the front of the Rutgers Riverside church, but here it is successfully developed as it was there only intimated. The result is an imposing feature of its kind, which gives the front a rich, festal, even "jolly" aspect. Whether that aspect is appropriate is quite another question.

Mr. Robertson has done quite his share of "skyscrapers," from the comparatively modest altitude of eight stories to the unquestionably immodest altitude of twenty, and even, in a project now in course of execution, to the "record" of twenty-seven. Of this latter, the Park Row building, it doth not yet appear what it shall be, and the drawing of one face of what will be a very conspicuous solid does not



CORN EXCHANGE BANK BUILDING (1892).

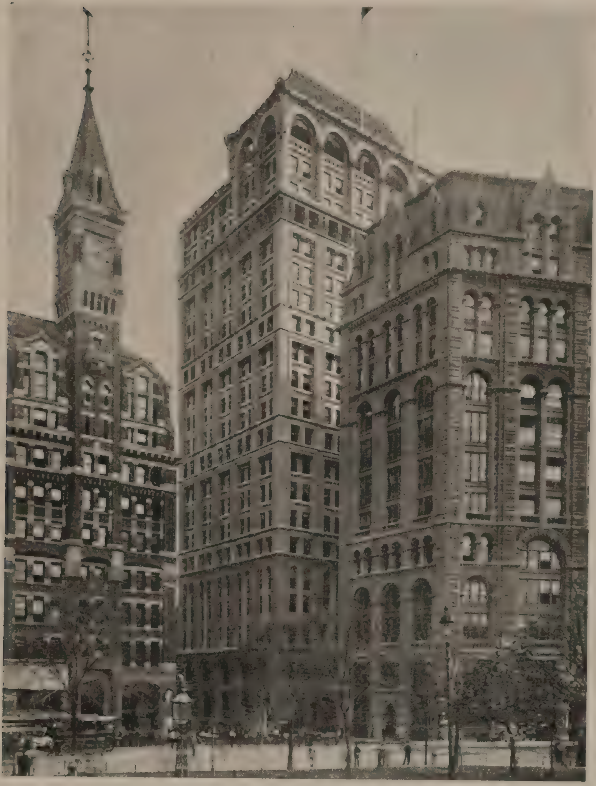
Corner Beaver and William Streets New York City R. H. Robe[illegible]ect.



ENTRANCE CORN EXCHANGE BANK (1892).

New York City. R. H. Robertson, Architect.

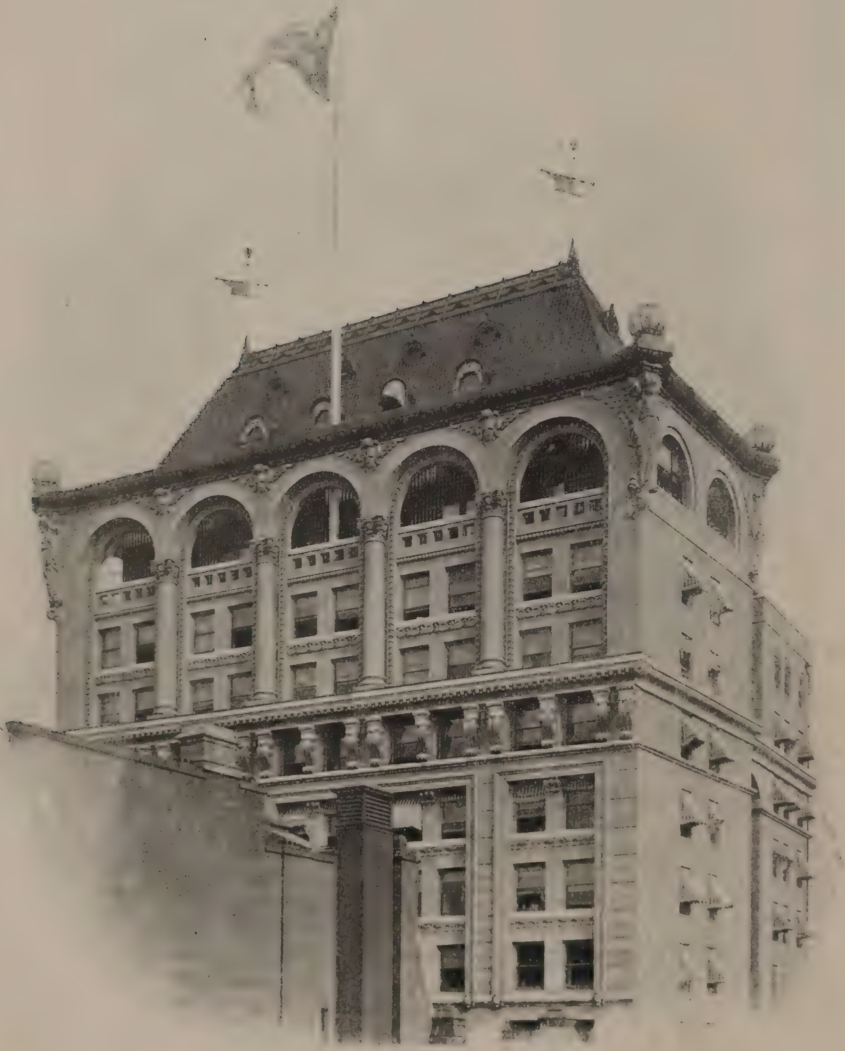
afford a basis for criticism. But every New Yorker knows by sight the Lincoln, the Mohawk, the McIntyre, the Corn Exchange Bank and the building of the Tract Society. Upon all these it seems to me a fair general criticism that Mr. Robertson does not, artistically speaking, take his skyscrapers seriously enough. That he takes them seriously, practically speaking, may safely be inferred from the fact that he has had so many of them to do. Of course the skyscraper is still *ferae naturae*, but a good many earnest designers have devoted themselves to bringing it within the reign of law. One of the things that they seem to have established is that the universal maxim that a work of art must have a beginning, a middle and an end, is in this case best observed by dividing the skyscraper into base, shaft and capital, confining the conspicuous ornament to the terminal member, and leaving the shaft unadorned, and undivided except by the necessary division of the stories. Mr. Robertson declines to recognize even this convention. In the Lincoln building, the subordinate division is carried so far as to confuse the principal division. In the McIntyre, the primary division is maintained, but the base seems excessive, though the main drawback to the effect of this is that the basement is the lightest and most open division and that the corner of the building has no visible means of support. Of course this is the architect's misfortune and not his fault, but its effect is none the less disastrous. The Corn Exchange Bank has an extremely satisfactory basement, an adequate substructure for the pile, and the colonnade that forms the capital is effective. But here the shaft is divided into two nearly equal parts by a horizontal member as important as any in the building, except the crowning cornice. The architect must I think agree, in view of the completed work, that the omission of this member and an identical treat-



AMERICAN TRACT SOCIETY BUILDING (1894).
Nassau Street, New York City. R. H. Robertson, Architect.

ment of the seven stories between basement and attic would have resulted in a more harmonious and effective building. In the Tract Society the basement is itself divided into two parts, and the superstructure under the cornice into three, consisting each of three stories, of which the openings are recessed, while the walls of the single stories that mark the divisions and belt the building are brought forward to the plane of the piers. The steel-frame construction has, indeed, a unit greater than a single story. If the architectural division corresponded to this and expressed it, the masonry might be arranged in the successive layers, dependent on the framing, of which the construction is composed, and so treated as to explain their dependence. Such a treatment would undoubtedly be an advance in expressiveness. But the triple division of the shaft here seems to be as arbitrary as that of the twofold division of the base, and not to correspond to any actual requirement, mechanical or aesthetic, although it is no doubt both more reasonable and more rhythmical than the division of the shaft in the Corn Exchange Bank.

Upon the whole, none of these tall buildings contributes very distinctly to the solution of the specific problem of the tall building, and none can be called successful in its entirety. The architect's power of design is shown in the parts, rather than in the whole, in the picturesque features in which his other work abounds. The basement of the Corn Exchange Bank, with the decorative treatment of the angle and the main entrance; the top of the McIntyre building, with the long colon-

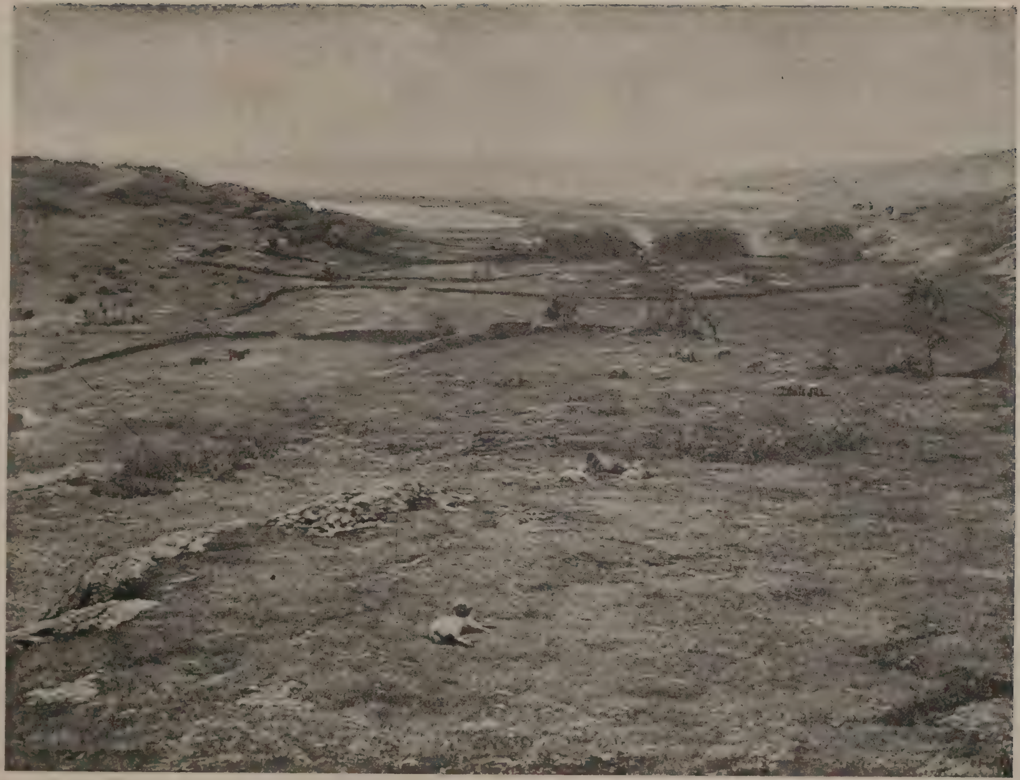


TOP OF AMERICAN TRACT SOCIETY BUILDING (1896).

R. H. Robertson, Architect.

naded attic and the picturesque corner tower; these are among the effective bits in our street architecture. A much more effective feature, indeed the most effective feature in the sky line of the lower city, as seen from either river is the crown of the Tract Society building. This does not pretend to "belong" to the building, or to answer any utilitarian requirement. In fact, it is emphatically detached by the withdrawal of the building behind it. It is confessedly an extraneous and picturesque crowning member. It has been so carefully designed in scale that it is effective and telling as far as it can be seen, and it would be rather petty to insist upon the illogicality of a feature which so completely justifies itself to the sensitive beholder.

Montgomery Schuyler.

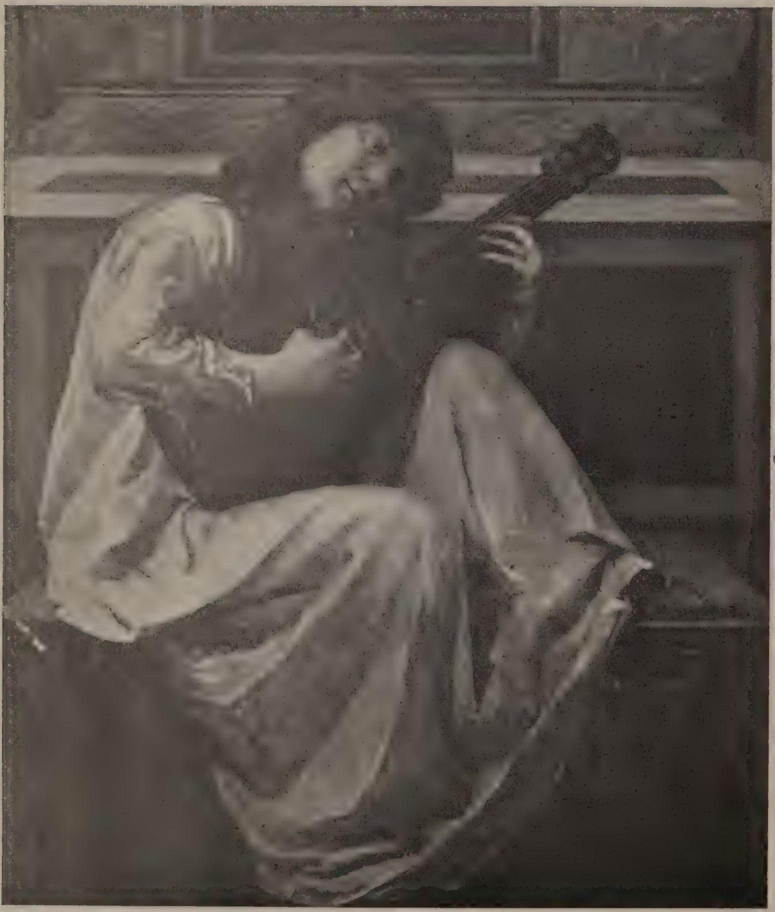


By John La Farge.

"PARADISE VALLEY."
Newport, R. I.
(Oil painting owned by Thornton K. Lathrop.)

BOSTON PUBLIC LIBRARY.

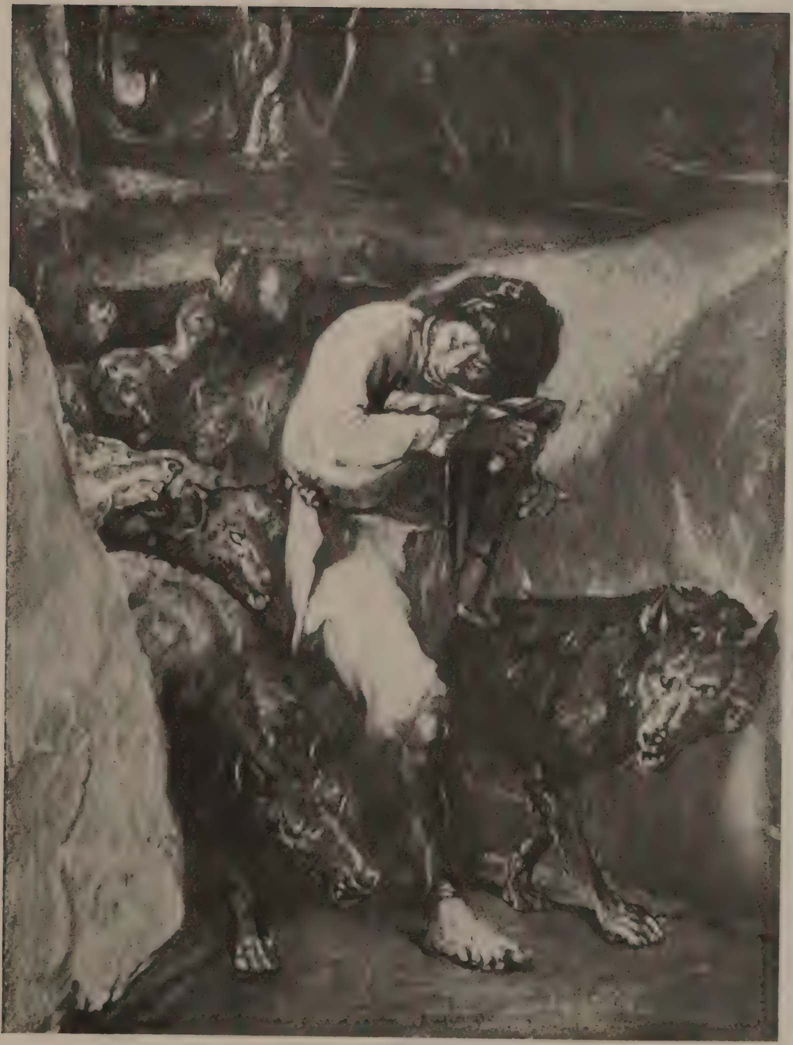
painter in his general practice, and although he is a French taught artist, so far as he is not entirely self-taught—he has yet produced at long intervals certain landscape pictures which are as different from anything which the modern French school recognizes as normal art as it is possible to imagine. Thus, the well-known "Paradise Valley"—the broad, green landscape painted twenty years ago at Newport, owned in Boston, and turning up now and then at an exhibition, is an attempt which no modern Frenchman would be apt to make. A broad stretch of flat, green meadow between rocky hills is viewed from a considerable height. The green uniformity fills the greater part of the canvas and stretches away toward the horizon, which, of course, is high in the picture, and between the green expanse and the horizon is the dim, misty gray of the summer sea. There is no foliage, nor any massing of distant trees; there is no very serious effort to paint a varied and expressive firmament of clouds—there is really nothing in the picture but the expression of the artist's delight in a great stretch of summer green. The idea of painting so large a stretch of landscape may almost be called English; it is certainly not French. The idea of painting the summer green so frankly, and of trying to do what few colorists dare undertake, namely, to make a piece of color out of summer green, may also be called rather English than French. The picture seems to the loving student who knows it well, as simple a piece of unconscious creation as any picture of the fourteenth century Florentine. During his visit to Japan, five years ago, La Farge made four drawings of what he saw in and around the valley of Nikko, on four separate occasions—at dawn, at sunset, and at noon, with cloudy and with brilliant skies. These small studies were made of what the artist saw, but, let us hasten to say, of what another person standing beside him would not have seen altogether. These four pictures, for pictures they are, though small and on leaves of a sketch book, are like Turner's work in their reverent love of mist and cloud, and of brilliant colored lighting of mist and cloud. They are like Rembrandt's work for their unity and intensity. They are vast in appearance and take the mind over imaginary miles of mist-filled or sunlighted valley, and yet they are small, brilliantly colored, highly decorative panels about sixteen inches long. Now, that may be said to be unconscious art. No reasoning up from the traditional doctrines of any school would have led in that direction. No modification of the doctrine of any school, even in a mind as varied and forceful as we think our artist's mind to be, would have given the material for the compositions. These are instinctive work if there ever was any—or if the reader would rather take a similar and more obviously simple design, let him take one of those little four-inch studies such as the Japanese boat with blue effects of sea and sky around it and setting it off like a curious little Della Robbia bas-relief. There are scores of small water-color drawings of flowers, and of these, the drawings representing roses and camellias are, perhaps, our readers' favorites. It was of one of these drawings that La Farge was asked why there was nothing in his roses of the translucency of petal and the delicate, thin, membranous quality which he enjoys who blows into a rose and gradually pulls it to pieces by his caresses. "Why," said the painter, "is that what you see in a rose? What I see is its solidity, its massiveness, like that of a little turnip." There is the expression of the unconscious artist doing his work in a way in which it seems to him natural to do his work. The thought "camellia" is as different to him from the thought "rose" as it is to the non-artistic young woman who goes no further than to see that one is fragrant and the other not, and that their surfaces are more or less shiney; but the differences are different, if an awkward expression may be used. People have been heard to ask whether such



By John La Farge.

"GUITAR-PLAYER."
(Lower Figure in the McKim Memorial Window,
Trinity Church, Boston, Mass.)

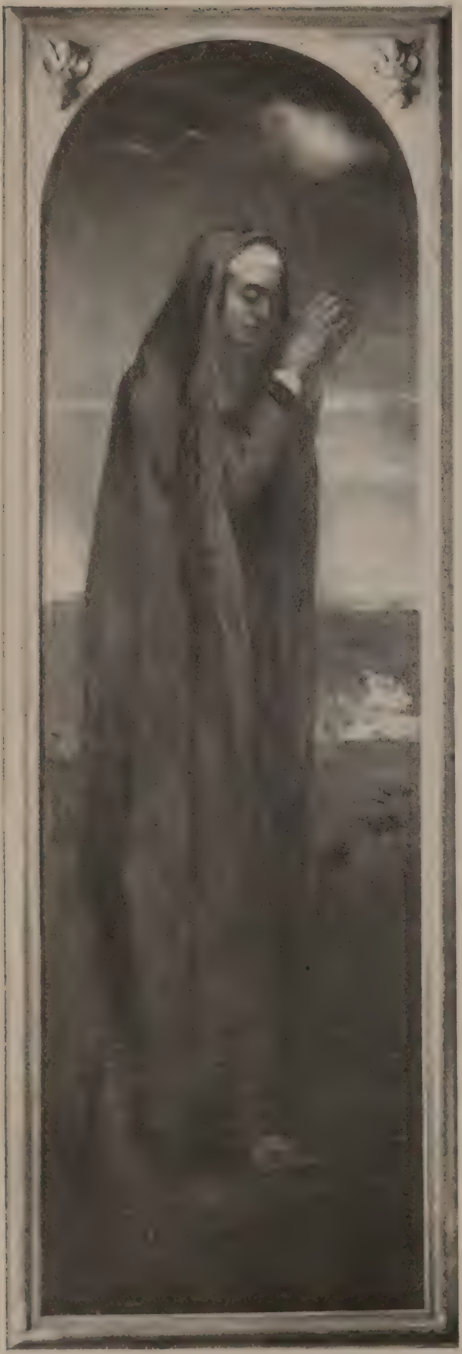
Photo. Copyright,
Curtis & Cameron, Boston.



By John La Farge.

THE WOLF CHARMER.
(Water color painting.)

Photo. Copyright,
Curtis & Cameron, Boston.



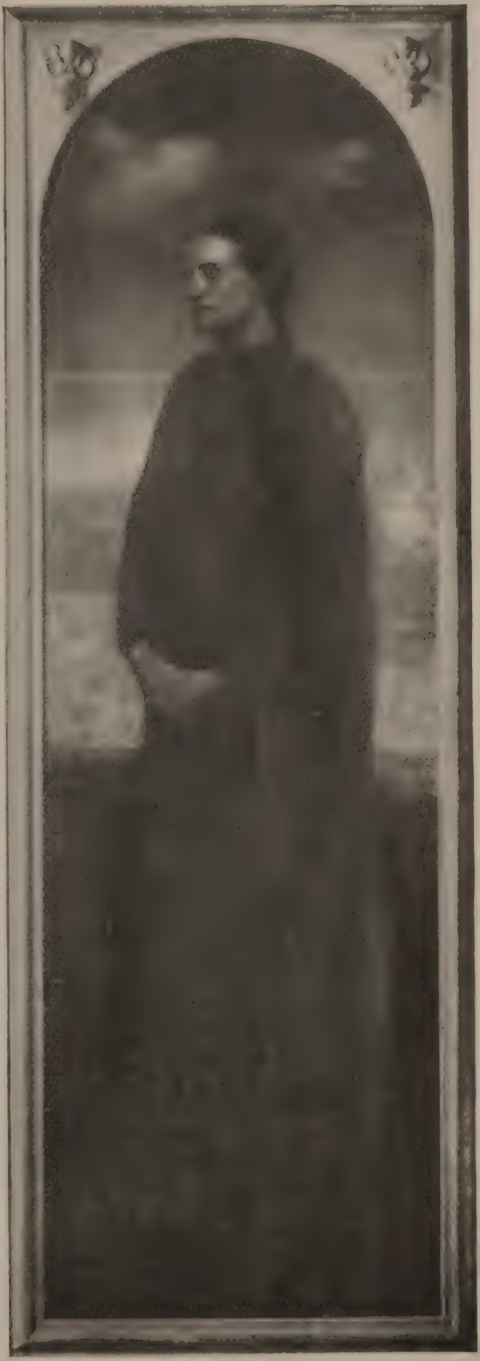
MADONNA,

Part of a triptych, owned by Wm. C. Whitney, Esq By John La Farge. Photo. Copyright, Curtis & Cameron, Boston.

and such a flower in a La Farge drawing was a rose or a camellia. And why did they ask? Because what the artist had to express about the rose or camellia was not the characteristic which was uppermost in the beholder's mind. What the artist wished to express was something which he intimately saw, but which, perhaps, the non-artistic lover of flowers might be excused for not seeing.

The same intimate relation between the artist and the subject to which he devotes himself, is characteristic of all of La Farge's work. In his very recent studies, made in the Pacific Islands, there are the visible evidences of what we all know of his life there—of the intimate way in which he entered into the life of the natives, became accepted as one of themselves, became a member of a great Polynesian family, and took the shark as his peculiar totem. He set himself to find out what it was that the natives were about, and how they were living. It need hardly be said that it is not in his art that the reasons why are to be found—graphic art has nothing to do with reasons why, but the facts as to what is being done are extremely intelligible. The leisurely labor, the serious and semi-religious dances, the more stately ceremonies, the semi-aquatic existence between sun and sea and palm-grove, the costume of every day, the ceremonial costume, even the chosen ornaments themselves, have been themes of the artist's close and minute observation. La Farge tells a story against himself, which is worth recording, of how one of his most characteristic drawings, which represents girls carrying a canoe, was objected to by the relatives of one of the girls in question on the ground that she would never be seen carrying a canoe with "those other girls." "But," said the artist, "I have seen her engaged in ball play, or what not, with the other girls in question." The answer was not less final and conclusive than the first statement was positive, namely, that the young lady might, perhaps, play ball, or go fishing with the other girls under consideration, but as for carrying a canoe with them, that would never be allowed to one of her caste. The artist had made a mistake that time, but that only shows that he was not concerned with recording an incident which he had happened to see. What he had tried to represent was the general daily business of carrying canoes and he had overlooked the necessary ceremonial distinction as to who should work in company with whom.

This character of intimacy, of personality, is, we say, characteristic of La Farge's work. It is seen in the realistic treatment of even his sacred themes. In his very last important work in glass, the action of the Savior as he talks to the disciples on the way to Emmaus as "he expounded unto them in all the Scriptures the things concerning himself" is conceived as in every day life. He turns away from one disciple and with both hands raised, with a friendly and natural gesture, impresses the argument upon him to whom he directly appeals. In like manner in the great Ascension in the Church of the Ascension, in New York, each one of the angels taken up separately, is human and real in gesture and pose. The figure of an apostle as an individual conception is recognizable as the man that he would have been in life as distinguished from other men. By which it is not meant that these figures are in any sense portraits of models. That is surely just what they are not. It would be absurd to maintain that La Farge copies his models; nowhere in his work can we pick out the models, even when well known, and say that this or that figure is a portrait of this or that living person. Indeed, La Farge's work, so far as it can be known, is never done by drawing from a model. He draws the figure abstractly and without reference to other than his already attained knowledge; and he uses the model afterwards to correct, to organize, to make supple and living the figure which he may have made too academic in the first place. All his figure drawing is personal and peculiar to him-



S. JOHN.

Part of a triptych owned by Wm. C. Whitney, Esq. By John La Farge. Photo. Copyright. Curtis & Cameron, Boston.

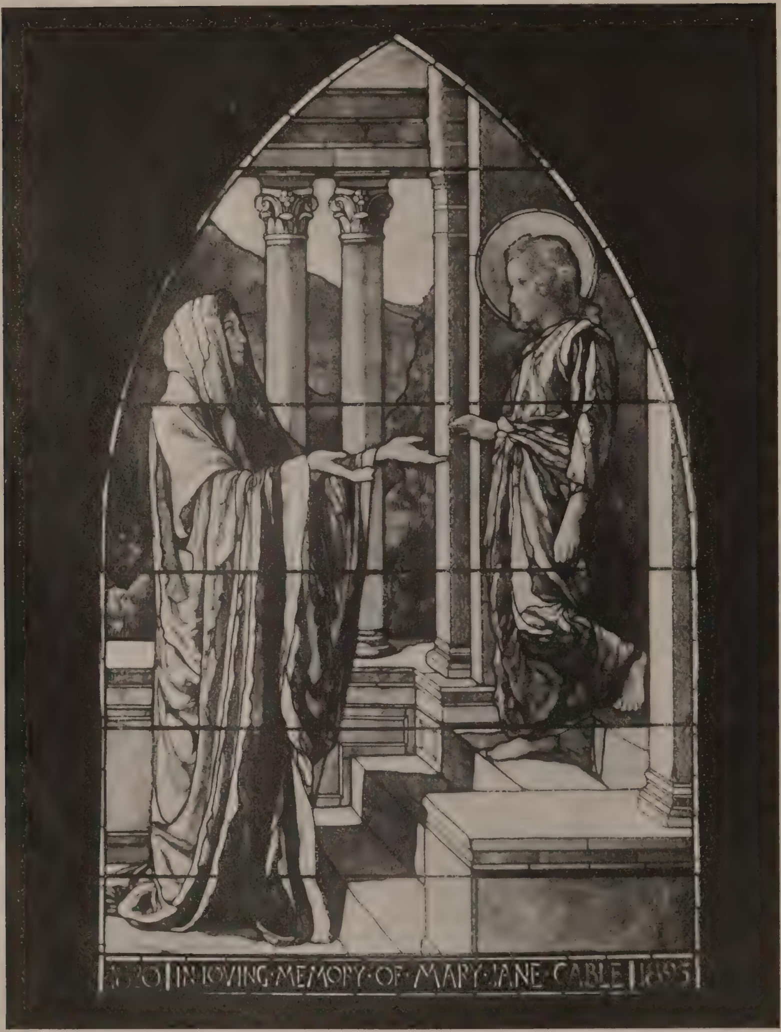
By John La Farge. "VATEA IN A SEATED DANCE, SAMOA."
(Pencil drawing.)

BOSTON PUBLIC LIBRARY.

By John La Farge.

BOSTON PUBLIC LIBRARY.

"SIVA IN A SEATED DANCE, SAMOA."
(Pencil drawing.)



By John La Farge. "CHRIST MEETING HIS MOTHER AT THE TEMPLE."
(Stained Glass Memorial Window ; executed in 1896.)

self: it is his own: it is design and not copying. His few book illustrations show this, indeed, but they are few, relatively unimportant and belong to an earlier period in his artistic life than it is now worth while to take up. Like most men who devote themselves with singleness of purpose and steadiness of well considered aim to a great pursuit, he has improved in it steadily, and the work of his sixtieth year is as much better than the work of his thirtieth year as great art is better than steady promise and earnest effort.

Character and color are the two secrets of La Farge's work. We have said a word or two, very inadequately, about the former of these two motives, and of the other, every person who knows La Farge's work at all is ready to speak. It glows in his studies of travel; it expands over the great wall paintings, too few in number, which mark the later stages of his career: it invests his large landscapes as well as his studies, and his small water-colors as well as his wall paintings. Even his studies in monochrome are the studies of a colorist. That beautiful drawing of the dry river bed in Japan, which has been engraved in a monthly magazine, is in sepia, and the drawing of the avenue of cryptomerias is in chalk, but it is impossible to conceive that either of these was made by any man who was not a colorist in the very essence of his being. To be able to compose greatly in color is to reach the highest achievement of graphic art, perhaps; and we have no colorist in this second half of the nineteenth century who is, on the whole, superior to La Farge. It is, therefore, of little moment that his monumental wall painting should lack something of the ultimate dignity of great draughtsmanship, as it was understood by the Florentine of the cinque-cento, or, if you please, by Ingres. It is quite easy to see that he looks at a wall which is to be invested with religious or historical subject from a different point of view from that which Elihu Vedder assumes. The wall is to glow with color and the color is to be so associated with graceful and subtile form that it shall appeal to that human sense of association which makes us all, even the most devoted art student among us, long for human subject amid the most splendid triumphs of pure artistical conception. It may be the conviction of the well instructed beholder that the nude figures in some one of his greatest paintings, if drawn in upon the drapery, would show that something was wrong with the pose, which is only the same as saying that his work sometimes falls short of perfection in the same way that Delacroix's work falls short of perfection, but not so badly. Andrea Del Sarto and not Correggio was the painter without fault (Andrea senza errore), and yet it is Correggio's domes and vaults at Parma which are the high seventh heaven of mural decoration with which nothing of Andrea's can for a moment compare.

It is because he is so great a colorist that his achievements in stained glass are so very notable. To have an excellent claim to the credit of having invented, or at least introduced our American way in glass, with its careful consideration of the leads as a valuable basis of the design, and with the free use of lining or "plating" with glass to replace enamel painting, is in itself not an artistic achievement; but when this was done in the service of superb color design, it does tend to make a man immortal. Translucent color is a different thing from opaque color, and it is from La Farge chiefly that the modern world has learned the truth that is conveyed in that axiomatic utterance, but the colorist is the man who shows that more plainly than another can, and who designs in translucent color not at all as he would design in fresco or in painting upon canvas. There is no room here to dwell upon the great works of the artist in glass, although they are known than they should be—as becomes inevitable from their relegation to churches widely separated each from the other, and many of them in remote towns. These windows taken together, constitute probably the most important piece of purely decorative work which the nineteenth century has seen, and go far to reveal to us the possibilities of the decorative art of the future—an art which must be, however, in the hands of the highly trained artist; the day of the inventive and intelligent minor workman having gone, as it appears, except as such inferior artistic intelligence can work in subordination and harmony with a great designer and executant.

And so we come back to the book, whose title heads this paper, with the conviction that the man is as natural, unconscious, and executive an artist as he is a philosophical thinker about questions concerning fine art. If then, we could gather the true thought—the whole thought — of this mature mind, we should have as much as any one student can hope to assimilate during his lifetime, and we should need no other teachers. This may not be: even careful reading and re-reading of the book before us will fail to get out of it all that the artist put into it. Is it possible to express in words all your meaning about fine art? Probably not, if you have much meaning, and yet, by the comparison of one statement with another, and by reading in connection with each statement the portion which has led up to it, and the inferences which are drawn from it, by disregarding the division into lectures, and by marking your margin with cross-references, by slowly meditating the meanings of some such phrases as we shall quote in a moment, more of the true essence can be got than can be extracted from any other book of our time. Read this, beginning on page 201: "* * * do not think I mean (by touch) only the actual contact of a fraction of a second. The long processes of a Dutch painter (or a Venetian) are all one thing: the firm foundation of drawing; the graduated underneaths, as painters call them; the vailings of their washes, or half-opaque coverings of paint; the glazings; the retouchings; the scumblings; the draggings of colored substances are all one thing, * * *if you think that the Japanese manner of running a brush full of ink, on paper or silk, is a short way, try it. * * * So-and-So of a couple of hundred years ago can no more be copied. The last man is dead who had the secret transmitted to him through all this time, and cultivated by him all his life. So that it is not to be hoped that any one will begin it all over again in Japan." Or on page 225-6, read this, and consider it: "* * * Why do we use all these things haphazard to-day? One man likes this, another that, as if he were some little lady anxious about being in the fashion, and willing to go even against her complexion, provided she do nothing that others do not do. And at length architecture, the means of largest importance that we can use, takes on a dress of triviality; like the madonnas of southern countries, dressed in paper and satin, with real costly diamonds, perhaps. * * * I was thinking * * *of the extreme dignity of architecture as illustrated by a saying of Delacroix—that a great architect was rarer than rare, and consequently held the very highest rank as an artist; because he had to find beauty in what is most irrelevant—usefulness." Or on page 227: "* * * the pyramidal composition of the books and of the schoolboy in art. But Raphael did it—and so did Homer, write in hexameters. Which is the important thing, the hexameter or the Homer? It is just Raphael's beautiful way of escaping the suggestion of grammar which is his charm." But this statement leads on into pages of delicate ratiocination into which we cannot follow our illustrious author, and the real profundity of the thought on page 229-30 is beyond any attempt that we can make here to analyze the meaning.

Russell Sturgis.

By John La Farge.

"DANCE."
In residence of Hon. Whitelaw Reid,
New York City.

Photo. Copyright,
Curtis & Cameron, Boston

NEW BOOKS.

THE HISTORY OF MODERN PAINTING. By Richard Muther, Professor of Art History at the University of Breslau, late Keeper of the Prints at the Munich Pinakothek. In three volumes. Vol. I.; pp. XI.; 604. Vol. II.; pp. XI., 836; Vol. III.; pp. XII., 871. Macmillan Company, New York, 1896.

It appears from a brief note on the back of the title page that the first volume of this work was translated by Mr. Ernest Dowson, Mr. George Arthur Greene, and Mr. Arthur Cecil Hillier, and the second and the third, by Mr. Arthur Cecil Hillier alone. The English text is smooth and but rarely gives any suggestion of having been an offset from the German. It might even be said that the text is fluent and somewhat diffuse, and yet this is clearly not the result of an attempt to give in one language and in too many words that which is more brief and compact in the original, but is, to all appearance, at least, characteristic of the original composition. It is only now and then that a complete mistake in the use of a noun or adjective suggests that the German original has not been perfectly rendered. It seems better to take the book as if it had been written originally in English. The question is, whether this work, as it now stands, is worthy of careful study, and how far it contains the essential, the most important facts concerning the painting of the last one hundred years.

It is extremely difficult to state in a few words the system upon which the book is built up. One would hesitate, after reading the titles of the five books and of the fifty chapters, to decide just where he had better look for any given artist. Is such or such a painter to be considered as a German colorist or a German romanticist? Shall we look for Gericault under "The Generation of 1830" or under "Juste-Milieu?" Shall we inquire for J. M. W. Turner in the chapter headed "English Painting in 1850" or under "Landscape from 1830?" An index of the names of painters at the end of each volume may keep one from falling into error in this matter and, no doubt, after a time, the evolution which the author has tried to describe will be understood, and his reasons for the choice of this or that order of sequence will be appreciated. The five books, indeed, are entitled, respectively, "The Legacy of the Eighteenth Century;" The Escape into the Past;" "The Victory of the Moderns;" "The Painters of Life;" "The New Idealists." It is plain, however, that if each painter is to be treated at length in one place only, it must often be hard to fix upon that place. Nearly every artist is to be looked at and his life work judged, from several different standpoints, and nothing but an elaborate system of cross-reference can make the continuous and interesting narrative fully available as a work of reference.

Book II., "The Escape into the Past," is, of course, intended to explain the way in which the early years of the nineteenth century were marked by a study of the classics and an attempt to get classical severity into painting. This tendency is not confined to the first few years of the century; it comes up again at a later time, as is shown in Chapter XI., "The Generation of 1830," where the Classical Reaction is especially set down in the contents as one of the important parts of the discussion in this chapter. The fact of the existence side by side of tendencies as different as are those which we call classicism and the romanticism of the years following 1830, is, of course, a central fact, and one which the text of our author explains fully and dwells upon with patient and even with delighted attention to detail. It is, however, as nearly as anything can be, impossible to carry on the history of art in at least three great nations and during an epoch of constant change and constantly arising contrary and hostile tendencies and yet keep the narrative logical and consistent in its arrangement. As has been said above, nothing but a very elaborate system of reference and cross-reference would enable the author to maintain the organization of his unrolling narrative in any way complete. Indeed, these absent cross-references an attentive reader finds himself longing for. To take a copy of this book with its broad margins, and annotate it with innumerable memoranda of where this or that particular subject is considered farther in these volumes, or where a painter, briefly mentioned, is discussed more at length, is to double the value of the work for reference. Its value as a book to be read consecutively will be considered in the course of this paper.

The first page of the Introduction states truly that "no book, hitherto, has embraced the history of European painting in the nineteenth century," and also that "modern art, like modern culture, is to be considered as a whole." This is the key-note of the work. The first book, which occupies 150 pages of Vol. I., deals with Hogarth, Gainsborough, and Richard Wilson; with Watteau, Greuze, Gesner, and Hubert Robert; with the reactionists of the latest years, and with the inevitable tendency toward the romantic and realistic in art, which, though it was not plainly seen in the nineteenth century, was there and ready to express itself in the new era. From page 209 of Vol. I. to the close of Vol. III., the whole field of European painting is kept in view together, and a semi-historical sequence is maintained, while at the same time, the tendencies of schools to express themselves strongly, contemporaneously with the vigorous action of other and, perhaps, hostile schools, prevents a strictly chronological order. Chapter VI., which is the first chapter of Book II., deals with the "Nazarenes," or the painters like Overbeck, Fuehrich, Schnorr of Carolsfeld, their piety and their ecclesiology; Chapter VII. deals with the Munich art under Ludwig I., Cornelius and Kaulbach, "their importance and their limitations." And here we begin to see that fearless and large-hearted criticism which marks this book from beginning to end, and makes it an important document for the art history of the century. The analysis of Kaulbach's art is so thorough and satisfactory, and the boldness of disapproval is so surprising in a German professor and museum employee, that it must startle the reader who expects to find that most valueless art of Kaulbach's ranked high in the way of modern achievement. Chapter VIII. is devoted to the "Dusseldorfers" and to the interesting question "why their pictures, despite technical merits, have become antiquated;" a question which old New Yorkers who know what was exhibited in this town before 1860 may, perhaps, be able to answer, at least, in part: while disputing the too bold ascription to the Dusseldorfers in a body of any remarkable "technical merits," Chapter IX. deals with Alfred Rethel and Moritz Schwind; and here we have to note in connection with that extraordinary tragical designer, Rethel, that our author is as much interested in a cheap little wood-cut as he is in a wall painting forty feet long, provided always it has style in it and looks large, as good designs are apt to look. It is necessary to state here that the illustrations of the pages we are now considering have been taken from engravings, and the reader will hardly need a hint as to the extremely lifeless and formal character of very many German engravings of important works. Here, in the pages devoted to Rethel, are two reproductions of his own wood-cuts, that is, of wood-cuts for which he made drawings especially, and which were probably carried out under his eye, and two others from large engravings by Brendamour, which assuredly caricature the important frescoes which they pretend to represent. The remarkable frescoes at Aix-la-Chapelle have been engraved in this way, and a photograph of one of the originals, compared with one of these reproductions, casts discredit upon all the illustration of this book which has engravings for its basis. But, indeed, the illustration of these volumes generally is not of first-rate quality; the half-tones are not clear and are too small to do justice to the originals, and one longs for, what would unfortunately be a great and costly book, an edition of this treatise with adequate illustration.

It is impossible to go on citing here the chief subjects of each successive chapter. Instead of doing so, let us ask the reader to consider the account of Gustave Courbet, to whom are devoted thirty-seven pages in Vol. II., which pages are illustrated by sixteen figures—not fine, of course, but intelligible—and also by the remarkable verses written in dispraise of the realists, those verses from which we take the well-known words:

> "Or, monsieur, s'il vous plait,
> Tout ce que je dessine est horriblement laid!"

This biography and critical examination in one, is really a most valuable treatise. The ardent friend or the strenuous antagonist of realism in painting may find it inadequate or unfair, but it is hard to see how one who is writing on the whole subject of the painting of the nineteenth century in Europe, could present the man and his work in its relation to that great art more fairly or more intelligently. In like manner, one is struck by the extraordinary insight, the simple thoroughness and the level-headedness, to use a very modern expression, of nearly all that is written about painting in England. Continental writers seldom see English art except through false spectacles, rose-colored or of pessimistic gray. To understand the force and the failure of pre-Raphaelite pictures, the effect of that strange art upon the realists who were to follow the pre-Raphaelites, the inherent value of such work as Madox Brown's, and such work as Rossetti's, the relation to the whole English school of the caricaturists like Rowlandson, Gillray, and Cruikshank and of the illustrators of "Punch," to have the good sense to cut Mulready down to ten lines, to see in Albert Moore "the solitary 'painter' in the group" of his contemporaries and to explain his beautiful and perfect art as it is explained here, to see the value of George Mason and Fred Walker without in any way seeing it too strongly, is to be an art critic indeed.

It may be said that the whole book suffers somewhat from a tone of laudation a little too warm. That is to say, the praise which is given with a little too free a hand; and yet, with what enjoyment could one read a history of painting in which every artist should be compared, each in his turn, with the very highest standard of excellence? No such book could be read for a long time together because the necessity of fair treatment combined with severe criticism would involve too elaborate a system of hair-splitting refinements. Everything that was said would have to be qualified and explained away, every assertion would have to be made with painful effort to be accurate and that at the risk of much involved ratiocination. The author is right, we think, in raising the standard of his praise a little above what he would, perhaps, more willingly adopt if he were writing of one artist or one group of artists only.

Finally, there is another statement to make which modifies unfavorably the very high estimate in which this book is to be held. The works which the author criticises are those which he has seen; that is obvious and natural. The works which he alludes to are those which he knows by reproduction, if not in the originals; that also is easy to understand. He takes "Punch" pictures from the "Gazette des Beaux-Arts" instead of from "Punch" itself, and pictures by Englishmen and Americans from European journals in which they have been reproduced; "L'Art" or the "Magazine of Art," or even from a publication of the Munich Photographic Union, or of Braun of Dornach. It follows from this that there are great and damaging omissions; not many, but enough to injure the book. It is, however, chiefly in the American school that we find these omissions to exist. In dealing with the Americans, the author has taken, as is natural and has been his custom, the works of art which he has seen in the exhibition galleries, or has learned of from their reproduction in Europe, and, therefore, it is, one supposes, that there is no mention in the index of any of the volumes, of Homer Martin, Elihu Vedder, or John La Farge. These may be mentioned as three of the older men who are not recognized; three men whose work has been before the public for thirty years. As for the painters of a somewhat younger generation, it is with them as it is with their seniors, that some are mentioned and some are left unnamed. It is clear that a volume on American painting has to be made which will make up for the shortcomings of the three volumes before us in this matter of the art which was trans-Atlantic to Richard Muther, and will complete and make a final authority of one of the most valuable books of our time.

EGYPTIAN DECORATIVE ART. A Course of Lectures delivered at The Royal Institution by W. M. Flinders Petrie, D. C. L., Edwards Professor of Egyptology, University College, London. New York: G. P. Putnam's Sons. London: Methuen & Co. 1895.

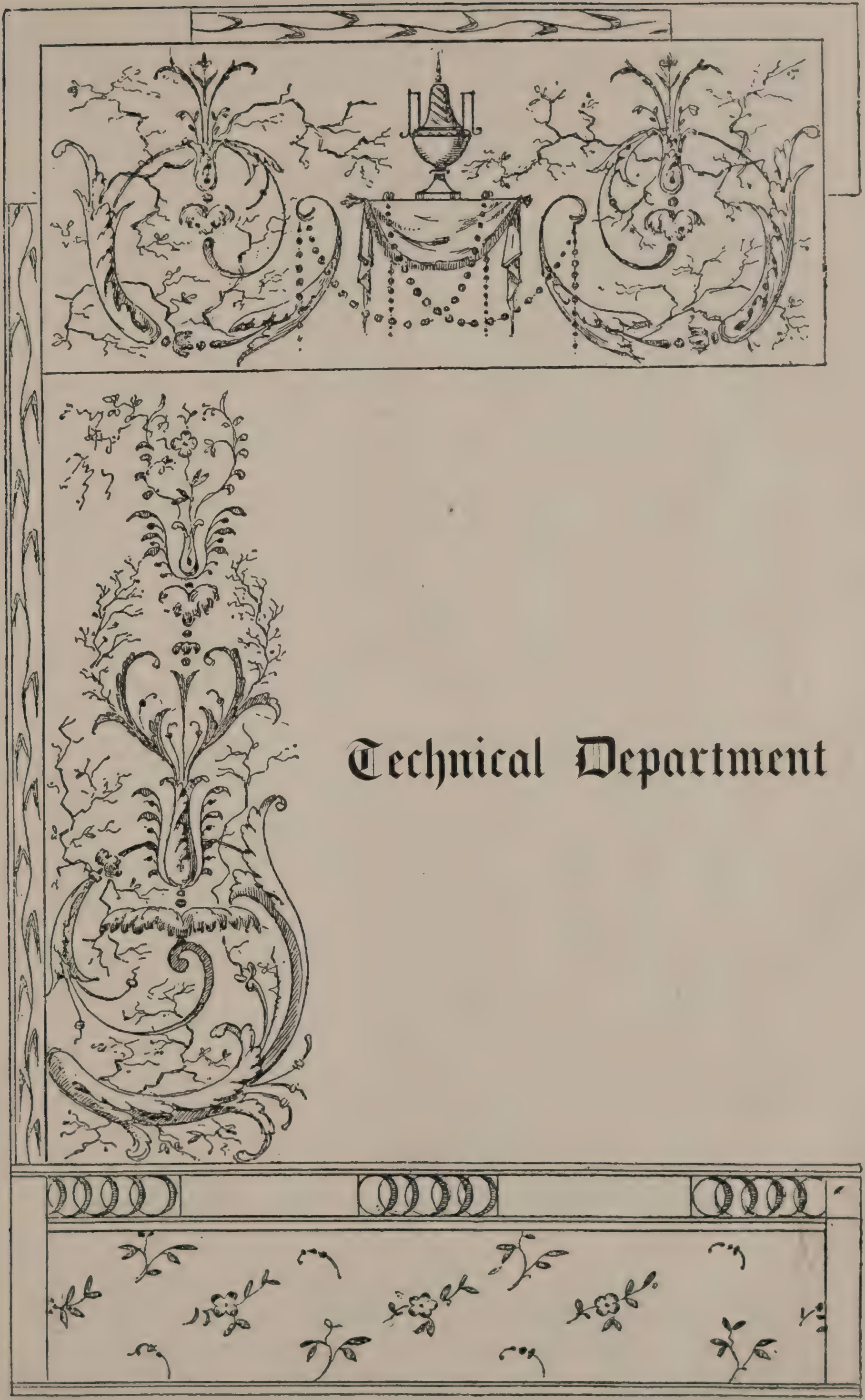
In No. 21 of this periodical there was occasion to speak of the attempt to write the history of primeval decorative art. Reason was found to conclude that one of the difficulties in the way of such history-writing was this, namely, that the scientific-minded man seldom knows anything about the artist's way of work. There is an assumption, which may almost be called general, in these scientific works on the art of savage life and of early civilization, namely, that nothing is designed for its own sake as an ornamental pattern or unit of pattern, but that every figure which seems to be such a purely ornamental conception, is the result of copying of some natural form which has gradually lost its character as the portrait has become a conventional figure handed down from master to pupil through the ages. It is probable that no one who himself feels the instinct of decorative design, and knows how others who feel that instinct work under its influence, will ever give in to this theory as heartily as its propagators would desire. The savage who cuts a notch out of a slip of wood is as much a reality in the unwritten history of the past as the other savage who has represented a head, in his savage way, or his successor who copies his copy of the head and makes it into something almost unrecognizable.

Professor Flinders Petrie is not to be charged with the fault we have dared to urge against many writers on these matters. His page 1 contains the statement that it is proposed in the little book under consideration "to limit our view to the historical development of the various motives or elements of decoration," and on page 2 there is this sentence: "As I have said, all Egyptian design was strongly decorative." On page 5 the other question which seems so interesting is fairly met and the discussion initiated of what is the real origination of patterns. The uncertainties attending any present answer to this question are hinted at in a very suggestive manner on pages 7 and 8. The arguments in favor of the origination of all designs in copying and of the constant repetition of these designs to the exclusion, almost, of any invented pattern, are compared with those doubts which arise in the mind of every person who understands art in a practical way; and if the author does not give a final answer to his own question, he sets an example of moderation which we may all be glad to follow. Page 10 hints at the "structural ornament which results from the structural necessities of building and of manufacture." It is shown that defects and failures are sometimes perpetuated in ornament of this kind, and an instance is given which will serve to remind us how puzzling in the future will be the origin of patterns of our own time. Whence come "the circles stamped in the plain end of meat-tins?" These tins, which we call cans, in the United States, have a circular patch soldered on to one end, and our author tells us that a circle is stamped in the other end, imitating the effect produced by the necessary closing of the top. It may, indeed, seem so very natural to us to stamp a circle concentric with the outer rim upon the circular end of a cylindrical vessel of any sort, that it will not seem to us probable that any future inquirer will ask whence it originated, and yet it has been in that way that patterns of ornament have originated in the past.

Chapter II. is devoted to geometric decoration and the zig-zags and diamond patterns, the wave lines and spots. The "spirals" and "coils" of the earlier Egyptian decoration are shown to have been copied and recopied, modified and altered during the centuries of Egyptian art. Basket work patterns and chequers are also a part of this traditional art, and here arises one of those questions which can never be answered in a final way, the question, namely, how far a chequer may be created as a natural way of decorating a surface by a man who takes a rudely squared stone and uses it to stamp with. The assumption of the scientific investigators is generally that all these patterns are copied from basket work. The interlacings and interweavings may, indeed, be so copied. It is certain, however, that a chequer may have come of paving a floor space as with bricks or tiles, and it would not require a very original workman to alternate a square of about 6 inches on each side with another square, maybe of nine small pieces 2 inches on each side, while yet a pattern so composed would be extremely spirited and vigorous. Now, whether a man who had once made such a pavement, or had even seen such a pavement, could go on and imagine others and scratch the patterns on a yielding surface without having a pavement itself before him, is a question which, apparently, the decorative designer would answer in one way and the scientific investigator in another way. Professor Flinders Petrie is cautious here, also. No one will find in this book an ex-cathedra statement of any of these questions, but its pages are filled with an analytical account of Egyptian ornament and the thought is made clearer by 220 illustrations.

All persons whose studies have taken them so far afield as to ancient Egyptian decoration, are aware how rich it is, how varied, how suggestive, and how tasteful and beautiful. Such a book as that of Prisse d'Avennes offers page after page of surface ornament which can hardly be matched in any collection of ornament of another epoch. Much of this beauty is indicated or suggested by the little wood-cuts of Professor Flinders Petrie's pages; thus, the cuts on pages 65-72, with their analysis of the Anthemion and 20 little pictures, would keep any designer busy for awhile. These little pictures are valuable as suggestions to modern designers, valuable historically, and valuable in this archaeological study, which, as we have said, is now coming forward, demanding so much attention. On pages 89 and 90 is an interesting suggestion of the Egyptian workman's way of looking at fine natural materials; his habit of painting, and even of plastering and painting his hard stone statues, while he enjoyed indicating the grain of alabaster and agate and such precious materials in painting upon common pottery vases. "Our abstract standpoint of an artistic effect which must never involve falsity, but which may have little or nothing to do with nature, was altogether outside of his aesthetic." This "abstract standpoint" is largely a modern one, derived from study of mediaeval art, and, therefore, it is better known and more generally recognized in England, where the study of mediaeval art has been so serious and consistent, than elsewhere in Europe. The attempt to try ancient decoration by it involves some curious considerations. In this, as in other matters, this little volume seems like a set of notes for a much longer and more detailed discussion.

Russell Sturgis.



Technical Department

A LEADING BUILDING FIRM.

AMONG the most prominent builders of New York stands the firm of McCabe Brothers, composed of Lawrence, Peter and Bryan McCabe, with offices at Nos. 33 and 35 West 64th street. They are builders of about twenty-eight years' experience, twelve of which have been passed in the construction of many high-class buildings in New York City.

The specialty of the firm lies in the construction of modern office buildings, residences of the higher class, expensive churches, halls and club houses. In making contracts for work of this kind the firm has been eminently successful, many of the best buildings of the city, designed by the best architects, standing to its credit.

Among the buildings constructed for R. H. Robertson are the Van Ingen building, 5 and 7 West 29th street; the Mohawk building. 5th avenue and 21st street; the McIntyre building, Broadway and 18th street; Holland building, Broadway and West 40th street; Academy of Medicine, West 43d street; New York Club House, 5th avenue and 35th street; Mendelssohn Glee Club House, 6th avenue and West 40th street, and St. Paul's M. E. Church, West End avenue and 86th street.

Among the residences constructed for the same architect are those of Chas. T. Yerkes, 5th avenue and 68th street; E. H. Van Ingen, 71st street; Mr. Stokes, 37th street and Madison avenue; and D. C. Blair, East 61st street.

This, it will be seen, is a very fine list of structures to come from the hands of a single firm for the same architect during a period of only twelve years, and it should be regarded as one of the best possible testimonials of the excellence of workmanship and general reliability of the firm. There are various things to consider when a contract is given for the construction of an expensive building; and when a builder takes contract after contract from the same architect it is a sufficiently good sign that he is lacking in nothing that can make his relations with his customer pleasant and profitable.

An examination of the work which the McCabe Brothers have executed after the designs of Mr. Robertson will fail to show any external or technical evidence why they should not undertake the construction of any building that the same architect may want to build. The work is all thoroughly well done. The material is of the best, the workmanship is of the best, and, of course, Mr. Robertson is satisfied with the promptness with which the contracts were executed or he would not have continued to favor the same builders.

Nevertheless, the McCabe Brothers are not exclusively builders for Mr. Robertson. Many other architects are recognizing the excellence of their work, and among their customers is to be found the firm of McKim, Mead & White. The well-known Century Club House, designed by Mr. White, and illustrated in a former number of this magazine, was built by the McCabe Brothers, and it is an excellent example of their workmanship. For Barney & Chapman they built also the pretty group of Grace Church buildings, standing on East 13th and 14th streets, a very attractive feature of that section of the city.

For Charles W. Clinton they built the Stokes building in Cedar street, and Sheldon building, John and Nassau streets; for De Lemos & Cordes, the Boskowitz building; for Barney & Chapman, again, the Revillion building, 13 and 15 West 28th street; for Jardine & Jardine, the Bonfils building, 5th avenue and 21st street; for Parish & Schroder, the Y. M. C. A. building, 56th and 57th streets, near 8th avenue; for Renwick, Aspinwall & Russell, the Gerry Society building, 4th avenue and 23d street; for Geo. Harney, Clinton Hall, the home of the Mercantile Library, Astor place and 8th street; for Clinton & Russell, the Rhinelander buildings, Duane and William streets, and the Woodbridge building, John and Platt and William streets.

The very substantial piece of work known as the Methodist Book Concern building, on 5th avenue, E. H. Kendall, architect, was also built by the McCabe Brothers, also Laight Street Stores, Clinton & Russell, architects; Lincoln Warehouses, Harney & Purdy, architects; Ehrich's Stores, William Schickel, architect; the professors' houses, General Theological Seminary, C. C. Haight, architect, and the Five Points Mission building.

The first thing that will strike the reader in running over the foregoing list of buildings, observing at the same time the names of the architects, and reflecting that the firm has only been operating in New York for a period of twelve years, will be the magnitude of its operations, and the superior class of the work that it has secured. Evidently, the members did not come to New York to grow up with the city, as men go West, but to help the city to grow up to the standard that they have themselves imposed. It was a good standard and must have been founded on a superior quality of material.

It must certainly be conceded that the McCabe Brothers make a very enterprising firm. It will go without saying that they are good workmen. No firm could have made the remarkable success which they have achieved in the same limited time had it not this accomplishment for a beginning. But there are other good workmen who have not achieved half so much in twice the time, and there must have been an additional basis in enterprise to help them in extending their operations. They have built well; but they have also had the energy to push their fortunes and the good judgment to find the right direction for their efforts.

There is truth in the old saying which declares that nothing succeeds like success, and it would be hard to find a probable limit for the operations of the firm in the future. It would be invidious, perhaps, to say that they may become the leading building firm in New York, because there are others; but it will be entirely reasonable to say that the others will have to look pretty sharply after their enterprises if they wish to keep pace with a firm that displays so much ability to get on.

R. GILL & SONS, CONTRACTORS FOR CUT STONE..

The business carried on by this well-known and reliable firm was originally established in Brooklyn in 1853, by Mr. Robinson Gill, the head of the present firm, and has during its long existence of 44 years, under its various styles of Gill Brothers, Gill & Baird, and R. Gill & Sons, constantly maintained a prominence and reputation second to none in the trade.

Their business in New York was commenced in 1878 as a branch of the firm of Gill & Baird, of Brooklyn, and was located at 65th Street and the Eastern Boulevard, with facilities which were supposed to be equal to any demands that would be made upon them. Up to that time the use of cut stone for building purposes was much more limited than at present, and the only material in general use was Connecticut brownstone; but with the development of the "West Side" and the rebuilding of the lower part of the city, came a largely-increased use of cut stone, with a demand for a greater variety of material, occasioned by the more decorative, as well as substantial character of the buildings erected. This gave an impetus to the stone trade, of which Gill & Baird received their full proportion, and the rapid and continuous growth of their business soon compelled them to increase their facilities. In 1884 they removed to their present location at 106th and 107th Streets and the East River, where they erected the finest plant for their business in the city. The premises are spacious, their works covering more than an acre of ground, equipped with the most improved machinery as well as every labor-saving appliance in use, and with a well-selected force of skilled workmen, averaging more than 150 in number, they are able to handle promptly contracts of any magnitude and of the plainest or most elaborate design or finish. Their location on the river front gives them special advantages in shipping to out-of-town points.

Upon the dissolution of the firm of Gill & Baird in 1888 the present firm was organized, with Robinson Gill as senior partner, and his sons, Frank N. and William H. Gill, as the other members of the firm. Under their able and judicious management every effort is made to enhance the reputation of the firm for honorable business methods, as well as for the promptness and skill with which their work is performed.

They have furnished the cut stone for the following buildings, of which Mr. R. H. Robertson was the architect (see illustrations, page 192-219). The Van Ingen Building, the Lincoln Building, the McIntyre Building, the Mendelssohn Club Building, also the Young Women's Christian Association Building, and St. Luke's Church. Among other buildings for which they have furnished the cut stone are the Manhattan Life Building, the Criminal Court Building, Calvary Baptist Church, residence for Mrs. Waldo, at 72d Street and Madison Avenue, and the Polhemus Clinic, now being built in Brooklyn.

No better evidence of the standing of this firm can be given than that this year of general business depression, has been, with them, the busiest one in their history.

CONTRACT AND SPECULATIVE BUILDING.

WE have no disposition to find fault with the speculative builder because he builds for a chance market. He is often conscientious; but he would ruin himself were he to attempt to compete with the best of the contract builders in the excellence of his material, and the thoroughness of his workmanship. Herein is where the contract builders have the advantage. They take little or no risks, and, if honest, they never acquire the habit of studying economy at the expense of their structures.

One of the best representatives of the contract builders of New York, is Mr. Harvey Murdock, a builder whose operations cover both New York and Brooklyn, and extend to any point where first-class contracts are to be made. Like all the best builders, he is a specialist. While he has built a number of large apartment houses, hotels and business buildings, his specialty is in the building of private residences on contract. He works only on percentage contract, it should be known, too, and is not therefore a speculative builder, or merchant builder, as some of the better class of our speculative builders would like to be called.

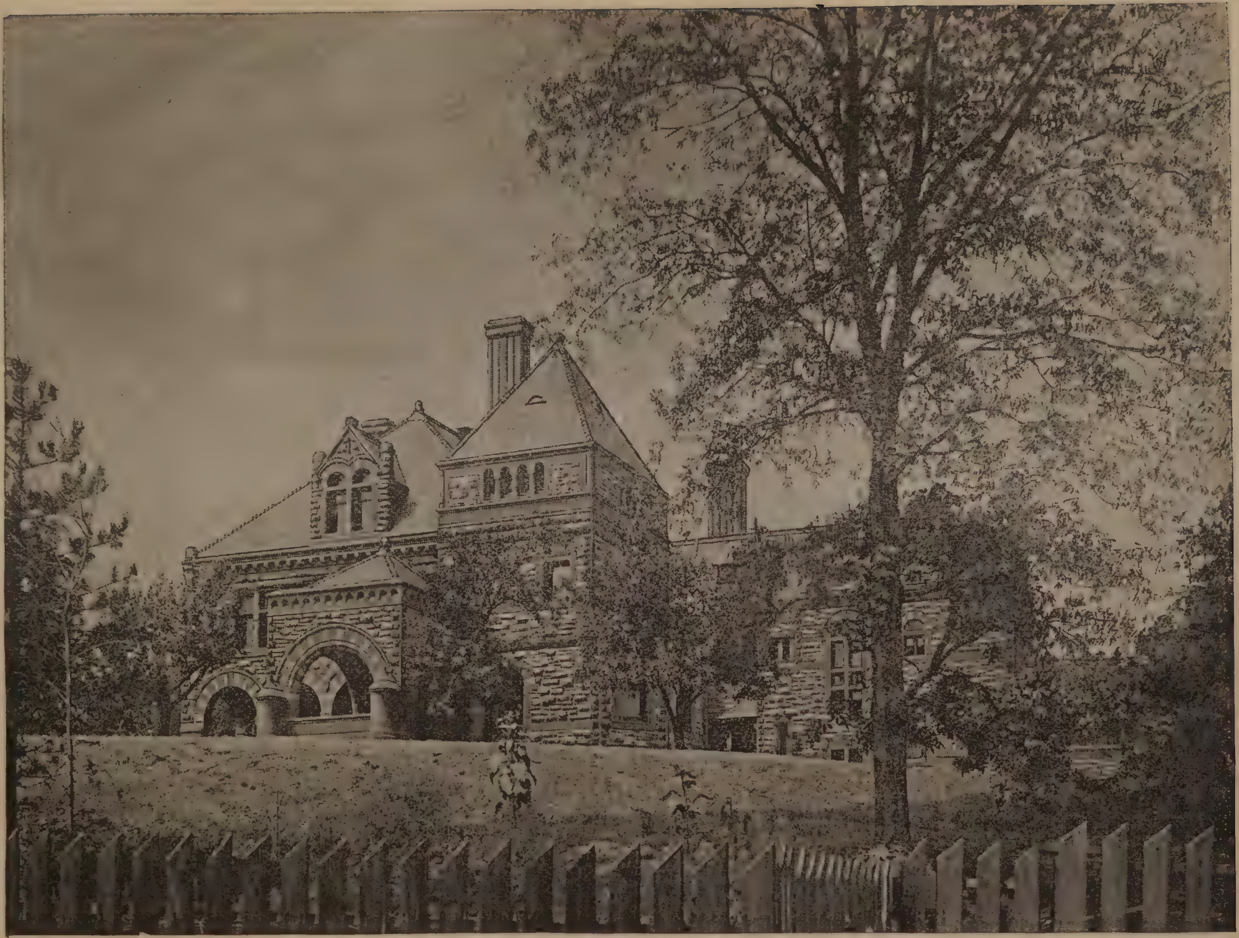
As a contract builder of residences, Mr. Murdock can be justly pronounced a man of the highest qualifications. In the first place he employs several hundred workmen, all of the most highly skilled class, and they work under the direction of thoroughly qualified superintendents and foremen. He buys the material and does the work directly with his own men, many of whom have been employed steadily for ten years or more. Added to this, Mr. Murdock gives his personal supervision and unwearied attention to his work, and having a thorough acquaintance with the building market, and a knowledge of the best furnishers of material, he is thoroughly equipped for all the details of his operations.

Mr. Murdock has been a large operator in Brooklyn. More than seventy of the largest and finest of the palatial residences and other buildings of that city are his workmanship, and they are conspicuous for their merit in a community not too fastidious in its selection of builders.

Among the most important of the dwellings, some eighty (80) in number, constructed by Mr. Murdock in New York, are the residences of Thomas A. McIntyre, E. C. Homans, the well-known banker, and that of the late Col. W. H. Harris. These dwellings are all located on West 75th street, and were built after designs by R. H. Robertson, architect, and are the most costly houses on the West Side.

But it would be useless to specify examples of the workmanship of Mr. Murdock. He has thirty-two (32) in course of construction now, on or in the immediate vicinity of Riverside Drive alone, with a different owner for each house; also others down-town and on the East Side. His apartment houses, hotels, and business places, were built to endure, and his residences were built to live in.

Mr. Murdock's office is at No. 140 Nassau street, New York City.



Springfield Ohio. VIEW OF RESIDENCE OF A. S, BUSHNELL, ESQ. R. H. Robertson, Architect.

The
Architectural Record.

VOL. VI. JANUARY-MARCH, 1897. NO. 3

MODERN DECORATION.

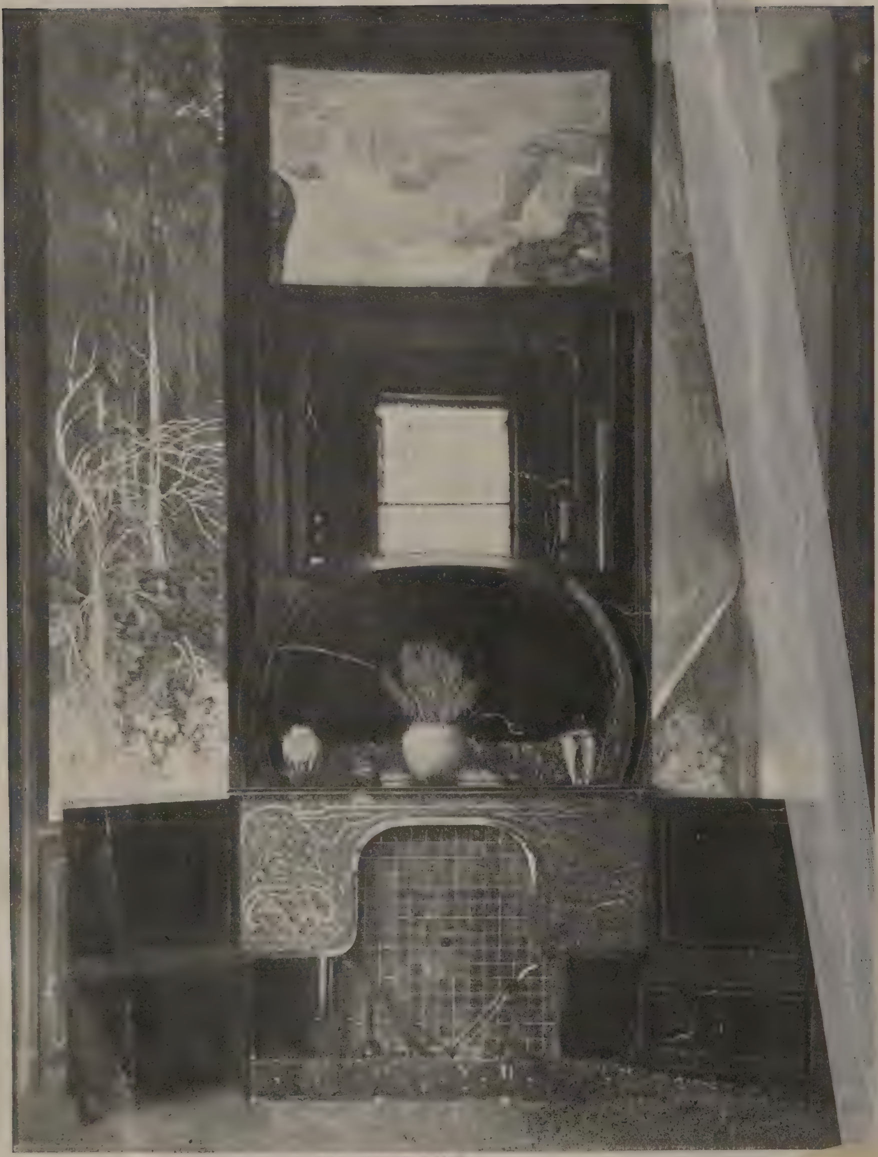
THE nineteenth century will leave no landmark in the history of decoration and the arts of ornamentation. Modern society has, so far, been unable to create any new forms of decoration, or to furnish and embellish its dwelling in an original style. This is a curious fact, and one that is difficult to explain.

The people of every epoch that has preceded our own were able to adorn themselves with a decorative garb to their taste. At the good periods, there has always been harmony between society and its surroundings—between the picture and the frame. Furniture and decoration under Louis XIV., for example, indicate the same tendencies, the same principles and the same elegancies, which, in higher domains, governed the development of the literature and art of that period. Racine's plays, Moliere's comedies, Bourdaloue's sermons, Le Brun's paintings, Coysevox's groups and busts—in fact, all the works of that time, proclaim a society fully conscious of itself, and of the beauty which it wishes to attain. That society has a character which it shows in the most diverse spheres; it distinguishes itself from the society which preceded, and from that which followed it; and just as it created a literature and an art of its own, so, without groping or hesitation, did it evolve a style of decoration adequate to itself and in perfect conformity with its needs and tastes. The Palace of Versailles, its architecture, its vast and noble halls, which are majestic, though in a theatrical sort of way, its marbles, its mirrors, its brasswork, its pictures and its furniture, sufficiently demonstrate the very special and distinct conception which the society of that period had of ornamental decoration in all its branches.

In the same way, the society of the eighteenth century, intelligent but frivolous, reasoning but sentimental, free and learned, created for itself a new decorative form which enabled its elegancies and its fashions to appear to the best advantage. The Louis XV. style, in spite of its affectation and its deformities, will remain the most perfect style that a refined society has ever produced. That society was, in a marked degree, worldly, rich and elegant. Living artificially, knowing little about family life or calm, peaceful leisure, it naturally attached special importance to the reception rooms—drawing-rooms and boudoirs—with the result that Louis XV. decoration and furniture are preeminently drawing-room decoration and furniture, and they were remarkably appropriate to the needs of the society of that time.

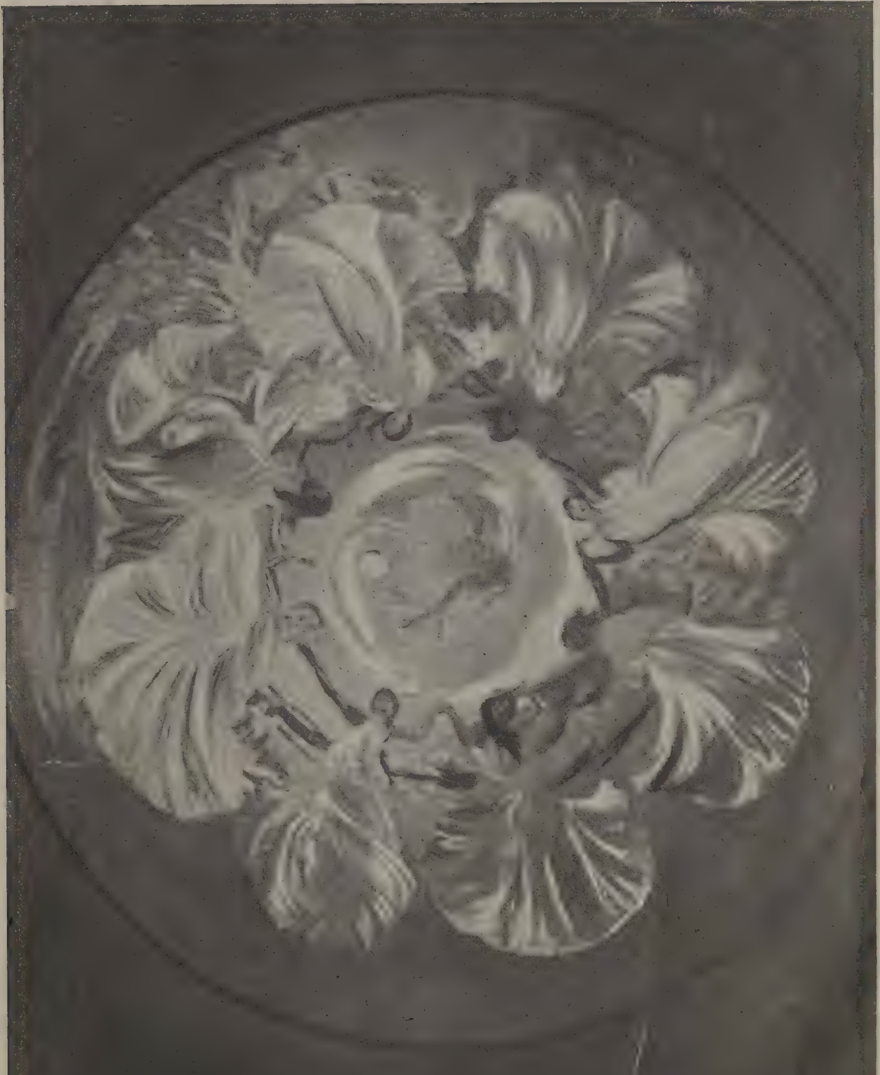
It should also be noted that, at those periods, which we call style periods, the art movement did not remain confined to painting and sculpture, but extended to all branches of

Copyright, 1897, by THE ARCHITECTURAL RECORD COMPANY. All rights reserved.



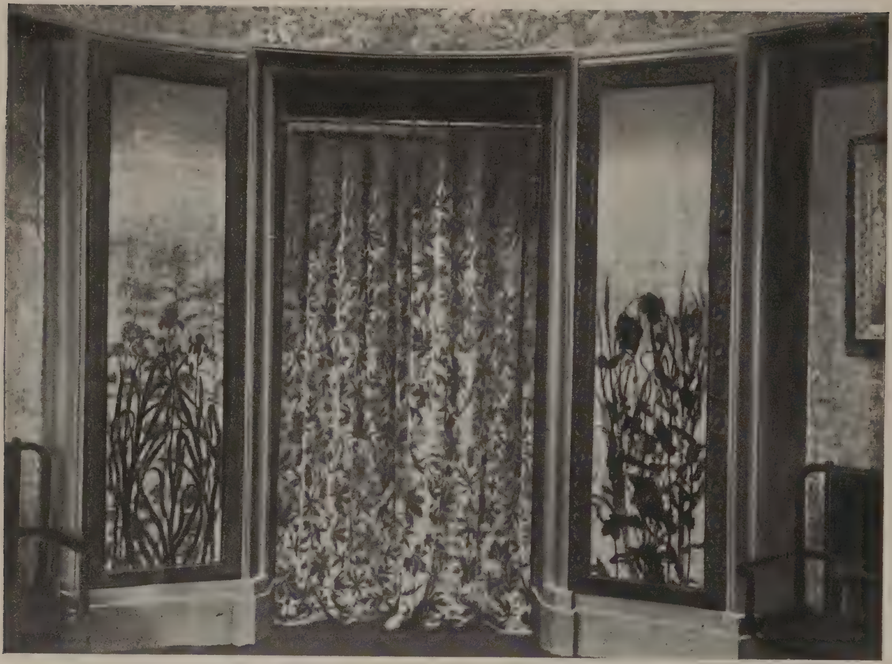
LIBRARY

No. 1.—FIREPLACE IN THE "ROTONDE BESNARD."
Hotel de l'Art Nouveau.



No. 2.—CEILING IN THE "ROTONDE BESNARD."

Hotel de l'Art Nouveau



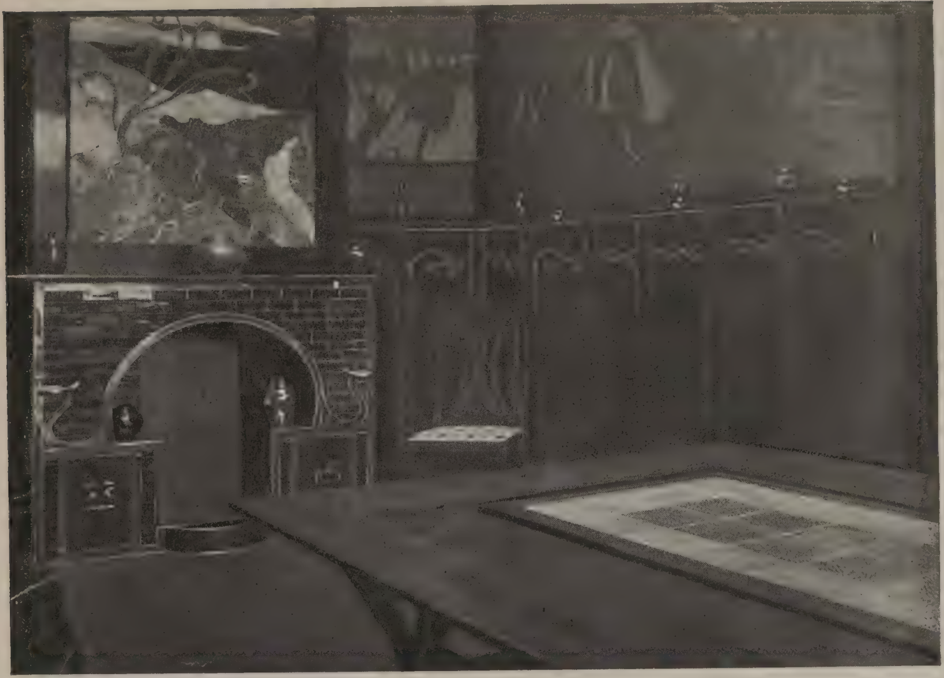
No. 3.—DECORATION.

Hotel de l'Art Nouveau. By M. Isaac.

the slightest productions of the various trades which contribute to decoration: wood, bronze, iron, tapestry, stuffs, silks, pottery, etc. One same tradition was followed and respected at all stages by the art worker. Hence the unity of the productions of a good epoch, as illustrated by the finished and perfect character of a Louis XV. drawing-room, that of the Archives, for instance.

In this manner, proceeding on parallel lines, we might, by consulting the furniture and the apartments of past times, compile a philosophy of decoration and furnishing, for the harmony between the society and the frame which surrounds it is so perfect that the latter leads up to the former and reveals to us its life and spirit. If this experiment were made in regard to our own time, what story would modern decoration tell as to the tastes and character of contemporary society? It would say that we are well-informed and inquisitive; that we like with an equal ardor or regard with an equal indifference the most diverse productions of the past; that we sit, according to the occasion, on a Gothic bench, on a Louis XV. chair, or in a morocco easy-chair; that the walls of our rooms may consist of Louis XVI. panels, Renaissance wainscoting, or be perfectly plain; that there is no trace of any dominant taste and no unity in the manner in which we decorate our apartments; that we accept an English dining-room contiguous to an entrance-hall after the fashion of the Middle Ages, and a drawing-room of the eighteenth century; that we burn gas in antique lamps, and that our candelabra in the style of a hundred years ago are traversed by electric light conductors. Hardly ever will one find an article made for the new purpose which it has to serve. We live on the past.

The decoration of some of the richest of modern apartments reminds one of the ceiling of a theatre. The Paris Opera House has too often inspired the decorators of the present day. On both continents we see the same subjects in gilded pasteboard, uncouth



No. 4.—THE DINING ROOM.

Hotel de l'Art Nouveau.

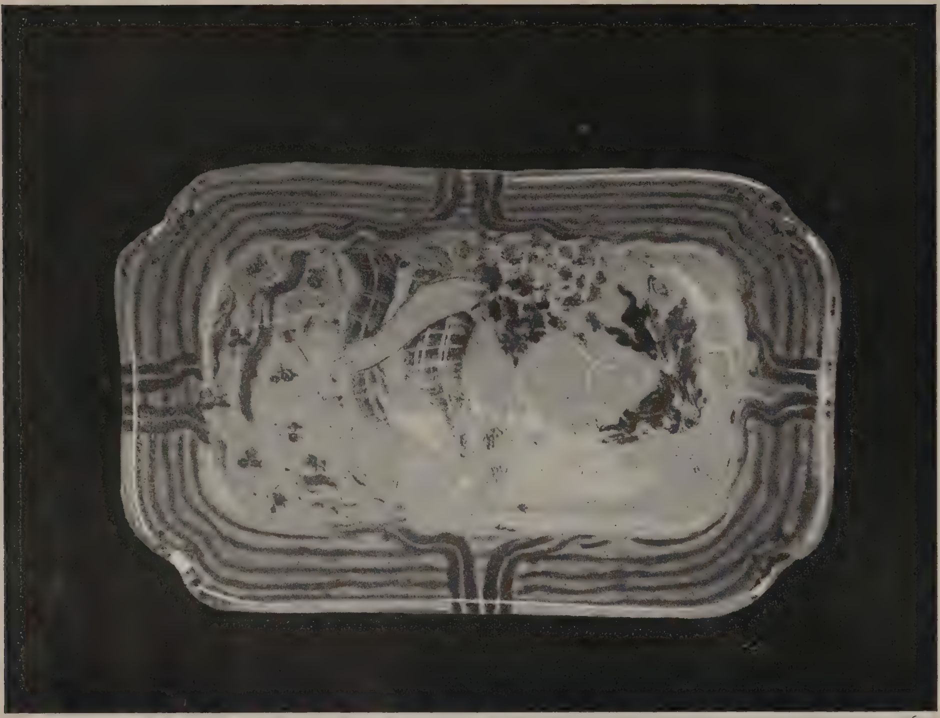
rubbish and trash which comes to us in a direct line from the rococo Italian style.

The best we are capable of is an imitation of the ancients, and even in this we have lost the knack of that clever handiwork which gives a priceless value to trivial objects. We do not know how to work iron, nor chase bronze, nor carve wood, as it was done a century ago. The workmanship has become coarser. It is necessary nowadays to manufacture on a large scale and supply a new class of customers, who are easily satisfied, and do not place artistic qualities above all else. Consequently, far from producing anything new we cannot even copy in anything but an inferior manner.

If our style of decoration is not historical, that is to say, borrowed from the past, then it can almost certainly be said that we have no decoration at all. We have very comfortable rooms, of which heaven preserve me from speaking any evil. They fulfil the purpose for which they are intended, but they have not the slightest artistic character, and do not reveal any tendency towards the creation of a decorative style.

Thus, an examination of our apartments would lead to the following discouraging conclusion: that modern society, confused and divided, has not yet succeeded in forming an idea of its tastes and requirements, and that, finding it impossible to discover any new form of decoration, it is reduced to living, so to speak, in other people's houses, and to reviving in its own behalf furniture and decorations made for other circles, and which were perfect only because they correspond exactly to the needs and the taste of their day.

Whence will the new style come? What nation will give it birth? We Europeans are trammeled by so many old memories that we shall, perhaps, be slow in evolving any original idea. Will it be America, freer, younger, and upon whom the past weighs less heavily? What has the fast-approaching twentieth century in store for us?



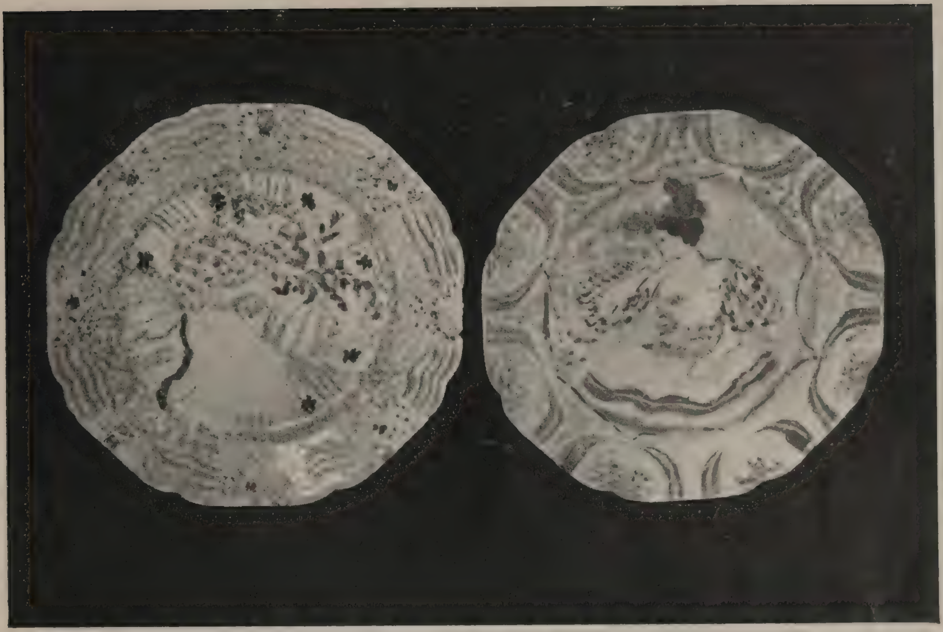
No. 5.—CHINA DECORATION.

By M. Vuillard.

Will it, too, continue to clothe itself in old-fashioned garments? These questions are full of interest, and reach further than they seem to, for a society worthy of the name and truly great cannot exist without art, which outlives everything, dead nations as well as extinct grandeurs.

However indifferent modern society may have been in these matters, it is right to state that there have recently appeared signs of an awakening. Everything, as yet, is in the preparatory stage; nothing is settled; nothing, so far, stands forth clearly; but we are seeking, which is already a great point, and we shall find. Artists are ridding themselves of the false idea formed during the present century that there is an absolute distinction between what are called the fine arts—architecture, painting and sculpture—and the decorative arts, and that only to the former can an artist devote his life. They do not disdain now to apply themselves to decoration properly called, to the study of special processes, and to visiting factories and workshops in search of new decorative forms. As a matter of fact, we shall have no modern decoration until all prepossessions in regard to the past are altogether dissipated: the new style must be wholly created by the free mind of the artist, who is not a copyist, nor a literal interpreter of styles already known.

We should like here to mention a few of the latest efforts made in very different domains, to indicate the idea of the artist, and to say, if necessary, the special process employed in these attempts at modern decoration. The house which M. S. Bing has just refitted in order to consecrate it entirely to L'Art Nouveau has given a number of people a desire to try to introduce innovations into the rich and interesting field of decorative forms, and in future L'Art Nouveau will give



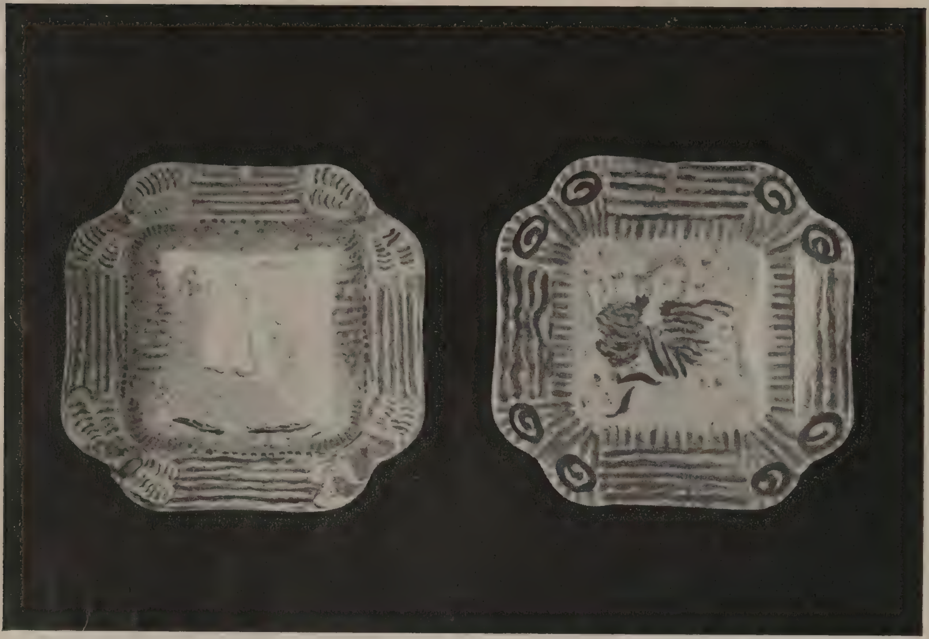
No. 6.—CHINA DECORATION. By M. Vuillard.

a hearty welcome to all endeavors in this direction.

As will readily be imagined, the programme so intelligently formulated by M. Bing has been the object of much criticism. These searchers after new forms have had to encounter the opposition of preconceived ideas, and have been greeted with a great deal of banter. In my opinion, the critics are wrong. It is evident that at the outset, we cannot expect to see a style that is harmonious and complete in every point, and whatever mistakes and blunders may have been committed, it is, nevertheless, certain that the efforts of artists have been turned into a new and excellent channel. Anything that will deliver us from the obsession, the unintelligent copying, of the past, ought to be received kindly and studied with interest.

Here is a drawing-room, decorated by A. Besnard, in which painted decoration plays the principal part. The room is round, and the walls are divided into long panels separated by the windows. The chimneypiece, of ingenious shape, harmonizes with the general form of the room, and the panels. The most charming part is certainly the ceiling, on which is represented a circle of women holding each other's hands and dancing. With great skill the painter has succeeded in keeping his figures in a ring and filling it with them only. The movements of the women and the very decorative line of their whirling skirts make this work a completely successful ceiling picture, and painters who have attempted a similar task know well enough how difficult it is. This drawing-room is lighted by electric lamps, placed out of sight on the circular cornice; the light is diffused by passing through a screen of yellow silk. It is, therefore, the painting which constitutes the decoration, and we reproduce the figures merely to provide food for reflection for artists who may undertake a like task, and to show them the elegant manner in which M. Besnard has solved a difficult problem.

Another artist, M. Isaac, has different conceptions. He would like to see stuffs play a new and a larger



No. 7.—CHINA DECORATION.

By M. Vuillard.

part in decoration. He would paint them, and at the same time let the material itself remain visible and palpable, an apparently insoluble problem. Yet he seems to have solved it.

M. Isaac's starting point is the old and sound rule, which is often forgotten nowadays, that each material requires to be treated in a particular fashion and in accordance with its own nature: in other words, that each material calls for a special method of work, a certain technique. This seems a self-evident truth, and yet it is one that is violated constantly at the present day. Every intelligent artist knows how to bend to his material; he respects it and tries to make it render only those effects which it is susceptible of rendering. In some countries the humblest workmen have this sense of the capabilities of the material, and their knowledge is displayed in the most insignificant productions of industrial art. For instance, it is these qualities of the material which give so much value to Japanese articles of virtu. The material employed is always of great beauty, and no article of the kind can be reproduced in a different material without losing thereby the very flower of its elegance.

Now, in the matter of furniture stuffs, we are very poor. We are restricted to cretonne prints, woven silks, brocades, velvet, plain or stamped, and the uniform tints of reps and plushes. Yet how interesting it would be to take a stuff of a certain texture—velvet, plush, reps or canvas—and cover it with a decoration which would religiously respect the tissue and leave unimpaired the special reflex of the material employed: the softness of the velvet, the iridescent depth of the plush, the clear markings of the reps, etc. Even more, the process followed might cause the stuff itself to contribute to the effect produced by the decoration applied to it, certain subjects and certain colors being particularly suitable for certain kinds of stuffs.

It is thus, I imagine, that M. Isaac has been led to undertake the decoration of a drawing-room with canvas panels, treated in an entirely novel manner. He employs three different processess:

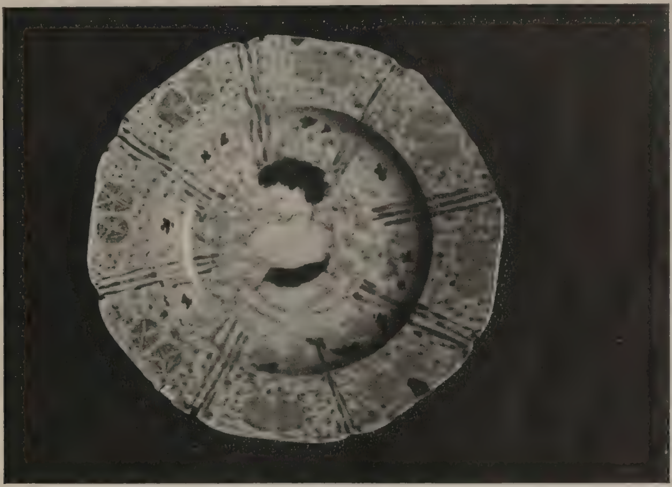
(a.) Upon a stuff of a given color, dark blue, for instance, he sketches the design which he has chosen; he then covers over the parts drawn upon, keeping them thus in reserve, and submits the entire canvas to the action of an acid. The acid bites the color off the canvas, except at the covered parts, which keep the original tone. Finally, the artist is able, by leaving certain parts of the canvas in more or less prolonged contact with the acid, to obtain the shades which seem to him the most suitable for the decorative effect desired.

(b.) The process is inversed; only the parts covered by the drawing are subjected to the action of the acid, the stuff being reserved. The artist can then either leave the parts bitten by the acid in the tone produced, or modify them by putting on such tones as he considers best. In this case also, the parts exposed to the action of the acid are so exposed for a length of time which varies according to the effect sought for.

(c.) A variation of the two preceding processes. The parts drawn upon are impregnated with melted candle-wax, which enters into the stuff and forms one body with it. The stuff is then subjected to the tinting methods already mentioned.

As is shown above, the material employed, the special texture of each stuff, is respected and remains intact. The decoration forms an integral part of the stuff itself. One easily sees what a great variety of effects can be arrived at in this manner, how the most opposite tones are brought, thanks to the shading, to melt into and unite with each other.

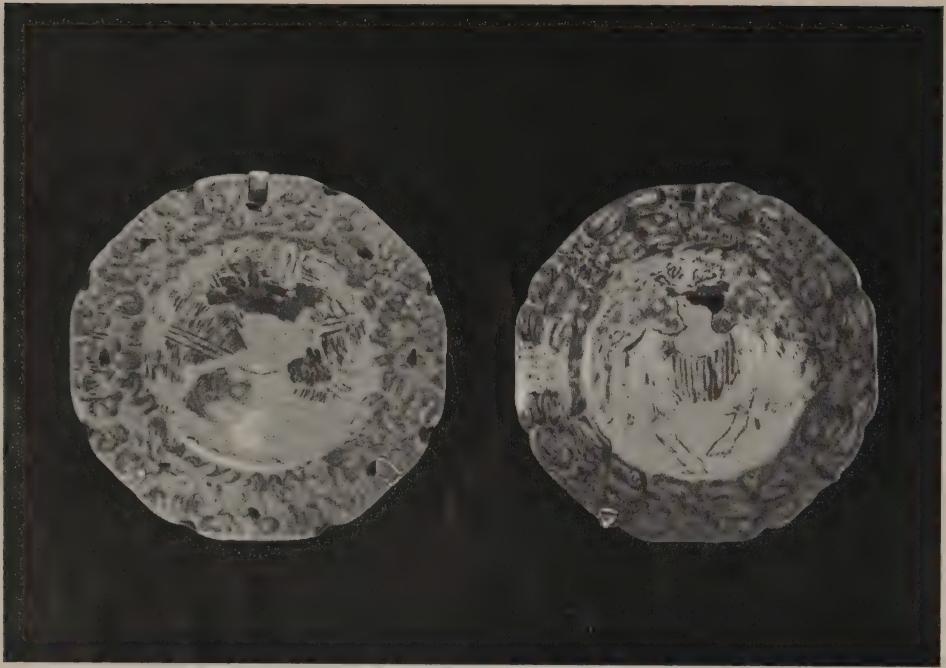
M. Isaac has decorated an entire room at L'Art Nouveau. The wooden frames have been treated with acids in the same manner as the stuffs, although the result is less frank and less happy. Illustration No. 3 shows two panels and a door-curtain of this room.



No. 8.—CHINA DECORATION.

By M. Vuillard.

What appears to me specially worthy of notice is the artistic freedom of work which this process allows of. China crepe, velvets and plushes can be treated in the same way without losing the properties peculiar to them —their suppleness, their twill, their individual appearance. Thus, not only decoration, but the fashions themselves, can benefit by the researches described above. One will be able to have a gown decorated. It is to be

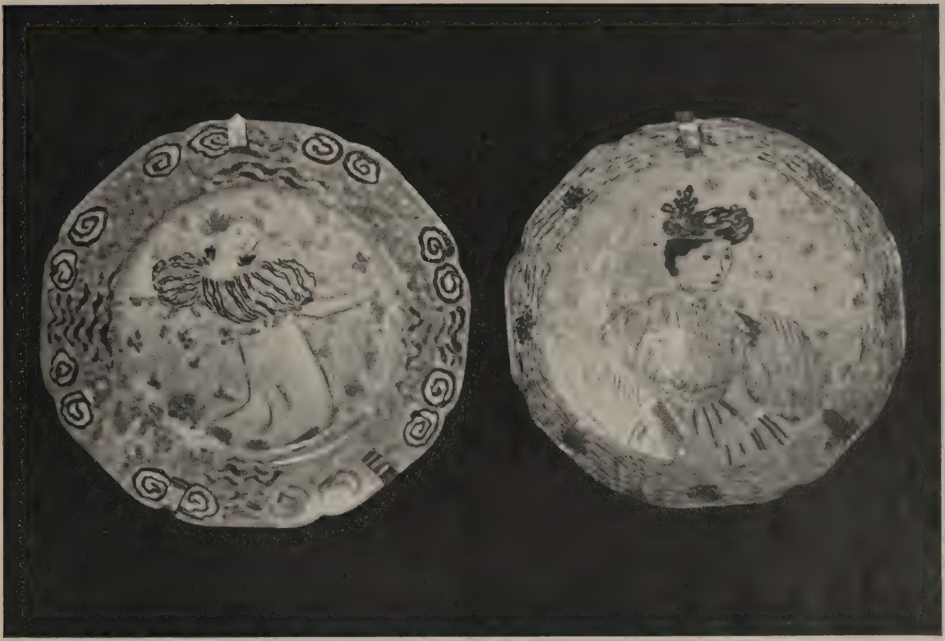


No. 9.—CHINA DECORATION. By M. Vuillard.

hoped that a number of artists will follow in the track opened up by M. Isaac.

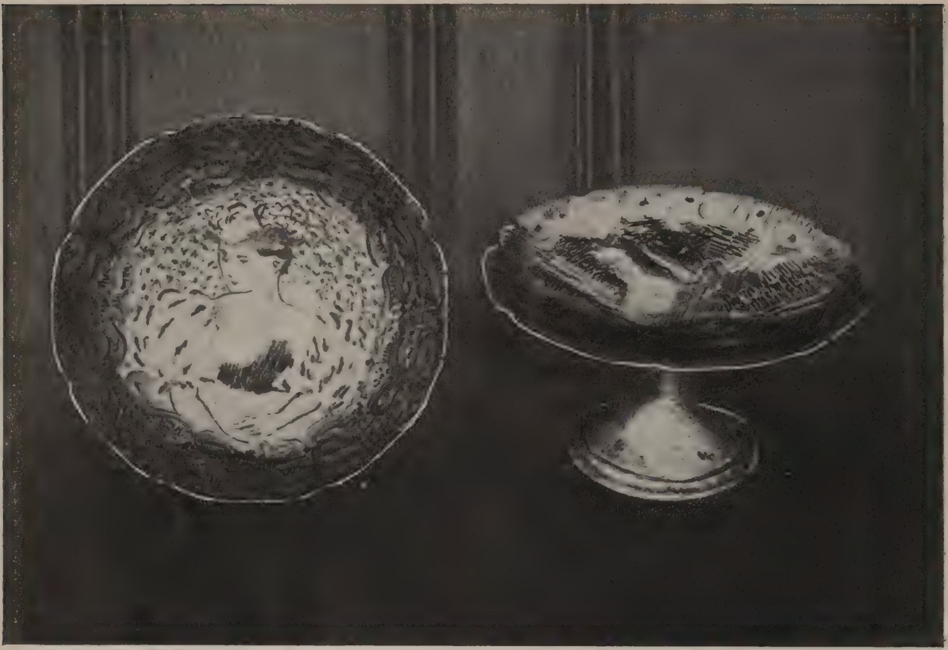
In the dining-room of the same house, wood is the principal feature. The wainscoting reaches as high as 5 feet 8 inches. It is surmounted by a console, upon which vases, jars and plates will be placed peasant fashion. Above, there is a painted decoration by M. Rauson, the general effect of which is, perhaps, not so satisfactory as we have a right to expect from such a sincere and clever artist. But what interests us most is the woodwork, which is inlaid with brass. The wood is polished cedar, of a clear, warm color. In each panel an ornament in polished brass is inlaid. This alliance of wood and brass is very happy, and, for such a purpose, quite novel. The illustration (No. 4) which we give only serves to give the lines and an idea of the brass ornamentation; in reality, these two substances combine together in the most charming fashion. The chimney-piece, where the brasswork mingles with the bricks, is surmounted by a fine stained window executed by Mr. Louis Tiffany, from a design by M. Rauson. The furniture of the room is in cedar wood, with the same brass incrustations. It has been made, like the dining-room, by M. Van de Velde. The general tonality and the form of the furniture make it a delicious summer dining-room suite for a country house. Henceforward, new combinations of wood and metals can be invented for the woodwork. There is no doubt but that equally satisfactory results will be obtained with other kinds.

The artists who are endeavoring to give decorative art a new direction, and to provide contemporary society with forms that are not merely retrospective, have tried their hands in very different domains. At the inauguration of the Hôtel de L'Art Nouveau, there was on view in the dining-room a china dinner service, the entirely original decoration of which was highly pleasing. It is the work of M. Vuillard, one of those young painters from whom great things are expected. At



No. 10.—CHINA DECORATION. By M. Vuillard.

this first attempt at china decoration he has produced something masterly. M. Vuillard has proceeded with singular sureness in the path which he has chosen. His decoration of an entire drawing-room—on canvas, with size colors—which can be seen and admired at M. A. Netanson's house, in Paris, had already drawn attention to him as an artist who is extremely thoughtful and conscious of the resources and of the limitations of his art. M. Vuillard is a painter in the true sense of the word; that is to say, a man for whom the world of color exists, for whom the greatest joys lie in a beautiful association of tones, in a tuneful scale of friendly colors and in contrasts brought into play in a harmonious manner. At the Hôtel Binet, M. Vuillard also exhibited some drawing-room panels, in which he has attained a formula still richer and more complete. In the china dinner set, which he has decorated, and which belongs to the writer, he has, on the contrary, handled new problems, and nothing is more interesting than to see how well he has been able to adapt himself to the exigencies of a different substance and a different kind of decoration. We know what the ordinary decoration of dinner services is, and how much remains to be done to finally give china an artistic character. In no other direction, we think, has such poverty and such a total absence of the decorative sense been manifested. Wretched plates on which are depicted scenes of gay life, shepherds in eighteenth century costume uttering weak compliments to their female companions, landscapes faithfully copied, mythological scenes, ornaments without reason and without any necessity—these are the things currently sold. We have seen a luxurious dinner service on which were pictured Tritons and dolphins ejecting water from their wide open mouths, and, the appetite once satisfied, it was impossible to resist a feeling of disgust to see these creatures mingling so much water with the food. And even when the decoration is only vegetable or geometrical, the absolute indigence of color and the want of skill on the part of the painters, who, it is



No. 11.—CHINA DECORATION.

By M. Vuillard.

easy to see, are simple workmen without any concern for art, also displease the eye. M. Vuillard thinks it is possible to decorate a plate artistically, and that if decoration be the sole object kept in view, many of the gross faults committed by china manufacturers can be avoided. He has chosen three simple colors, the effect of which he has tried by burning in: a warm reddish brown, a green and a blue. He has composed the service with these three colors alone. There is a different pattern for each dozen plates, seven in all. The dishes, the cooked fruit dishes and the sauce boats match the plates which they accompany.

As can be seen from the photograph which we reproduce, the ornamentation is everywhere treated in the boldest manner. Broad scrolls, some curled and some waved, adorn the plate; but the artist has taken care to preserve the form of the plate, and to display its characteristics. For the central motive of the decoration he has taken women—not Louis XVII, shepherdesses, but women of the present day. He has, however, been careful not to treat them as might have done a portrait painter or a designer of fashion plates. He has only taken so much of them as can be taken for decorative purposes. He has sought inspirations in the fashions of the day, and has made use of whatever was suitable to the work he desired to produce, and thus, reduced by him to their essential decorative signification, we have large spotted sleeves, silk blouses of assorted patterns, the low bodices, the large bows and the ribbons with which our women folk bedeck their persons; the immense hats with feathers, the waving plumes with which they crown themselves—in fact, all the frivolous and charming side of feminine life of the present day.

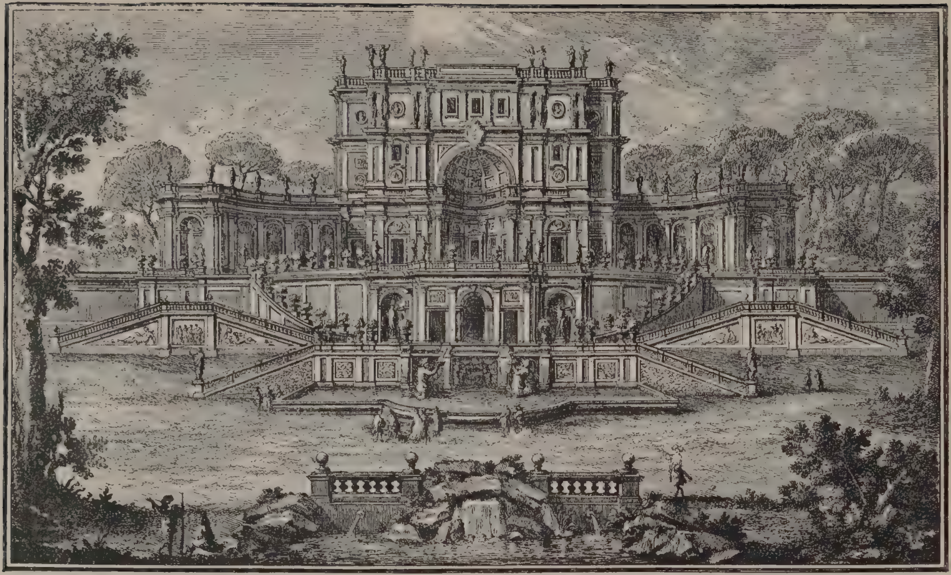
The tones of each dozen plates vary as regards their relative proportions. Thus, in the fish plates green predominates over the white at the bottom, and the plate is delicately light. In the vegetable plates brown and light blue give the prevailing note, which, in the meat plates, is indicated by dark blue.

In this way, using the three same

colors, diversely gilded, the artist has attained a great variety of effects while confining himself to the same gamut of color. There is here a great success in the domain of porcelain decoration, and it is a pleasant thing to see art lending its aid to the beautifying of the most familiar and common articles.

Such are a few of the novelties which have been produced in the almost unexplored field of modern decoration. We cannot doubt but that these efforts will inspire others, and in this manner, step by step, we shall see the decorative arts spring up again with new life; the taste of the public as well as of artists will become more and more refined, on each side a desire will be felt to cut away from the past and to give a new society a new frame and a new decoration.

Jean Schpofer.



VILLA SACCHETTI, FROM AN OLD PRINT BY G. VOLPATO.
Designed by Pietro de Cortona about 1626—In ruins for more than one hundred years.

THE VILLAS OF ROME.

IN matters architectural and artistic we find ourselves in much the same position that other people have occupied at the approach of the great movement which is known as the Renaissance. Like them we are emerging from a period of disorder during which we have had neither the time nor the means for the cultivation of artistic tastes, and like them we have suddenly found ourselves possessed not only of the desire for artistic objects, whether of architecture, sculpture or painting, but with the means by which that desire may be gratified. We have already felt the influence of the object lessons of the Chicago fair, itself but an evidence of the revival.

The Victorian Gothic, the Romanesque and the badly designed attempts at Classical architecture, which for many years divided the field of city building, are becoming more rare. Even in the country which is better adapted for picturesque architecture, the so-called Queen Anne cottage, which for the last twenty years has run riot in the unbridled license of shingled turrets and creosote stains, is giving place in popular favor to the revived Colonial.

It is safe, therefore, to predict that in the near future our country-seats will be designed in some recognized style of classic architecture, and that the surroundings of these buildings will show some recognition of the classic principle that there must be no abrupt transition from the formal architecture of the building to the unrestraint of nature—that there must be a middle ground where nature is indeed present, but restrained by architectural lines.

We have, indeed, always recognized these principles, though we have adopted quite different means than those of Italy, France and England for meeting their requirements. Previous to the Centennial our suburban dwellings, however badly designed they may have been, were still classical in outline, and we felt, though half unconsciously perhaps, that there was something incongruous between their rigid outlines and the equally uncompromising level on which they were placed. We tried to soften the vertical outline of the building with trellises and by breaking up the horizontal level of the lawn with shrubs to conceal the ugly angle. Ignorant of other motives of landscape gardening we abandoned the unsuccessful compromise, and instead of making the surroundings harmonize with our buildings we made our architecture subservient to its accessory.

It now became our object to make our buildings spontaneous in the landscape. Rock-hewn ashlar and even fieldstone carried up the lines of the undulating grounds which were now selected for the more picturesque setting of the new style of suburban house, while above the strong colors of the shingles blended with the landscape.

Our forefathers in colonial days solved the problem in the other way, and very successfully. In the formal boxhedged approach, in the disposition of their lawns and gardens, in their arbors and terraces, they found a simple but effective setting in character with the severe lines of their dwellings, whose charm is the more apparent in contrast with our revived colonial destitute of these surroundings.

A growing love of luxury and display will tend to increase the number and elaboration of our great estates and country houses. It is therefore timely to consider in what ways the architects of the Renaissance solved problems similar to those which will soon present themselves.

As the villas of Italy have served as models to all the other countries which have with more or less success attempted landscape gardening on classic lines, it is proper that we turn to the fountain source for our inspiration; but before we can study the villas of the Renaissance we must know something of the social causes which led to the erection of this type of dwelling.

While it is not within the scope of the present article to enter into any lengthy description of the villas of the Republic or of Imperial Rome, still the villas of the Renaissance are so intimately connected both in conception and plan with those of classic times that a short consideration of the latter will not be out of place.

It was during the last century of the Republic that the great villas of the wealthier citizens grew out of the unpretentious country-seats of more austere times, but it was not until the Imperial period that they attained their fullest development.

While a few of these villas were erected within the city walls, by far the greater number were in the suburbs, where there were greater facilities for the gardens which formed an important adjunct to the villa, or casino, itself.

It is difficult for a person, who traverses the desolate tract of the Campagna, to believe that the fever-breeding plain which surrounds Rome on every side was once a fertile valley, that the barren waste, whose grey fields, unbroken by tree or dwelling, are now so deserted, was once a densely peopled garden, covered for many miles in every direction with fertile farms and luxurious villas.

Here alike were the modest country-seats of the upper classes, the manors of the great patrician houses such as the Servian, Flavian, Claudian and Valerian families, and here were the magnificent establishments of the Emperors Titus, Claudius, Hadrian and Domitian, the solitary ruins of which still stand to further enhance the desolation of the Campagna.

To many of the great families belonged a number of villas situated in different parts of the Campagna. It was from no extravagant display of riches that they possessed so many luxurious homes. The English aristocracy is very similar to that of Rome, and from an identity of principles and education came identity of ways of life.

Like the English aristocracy the younger members of the families served in the army or in the diplomatic service, while those of maturer age sat in the Senate or held other places under government. This compelled them to remain near Rome during the greater part of the year, while the heat and unhealthfulness of the city made a residence in the country within easy reach of the city desirable.

The Roman season was short, so that during the greater part of the year the family lived in the country, and as the comfort of the house depended largely on its situation, those who could afford it built themselves several villas, some on the cooler heights of the hills or in the Alban mountains, some in the warmer plain of the Campagna, some facing the south that they might profit by the warmth of the sun, others to the north, east or west, according as their owners courted or avoided the various winds, which then as now play an important part in the Roman climate.

We are possessed of very accurate information, not only of the plans and designs of the villas themselves, but of the arrangement of the gardens and shrubbery which surrounded them and the modes of life of their owners. This is derived from three sources; from descriptions, such as the well-known letters of Pliny, in which he details minutely his Laurentine villa, and many passages in the writings of Cicero; from fresco representations, such as are depicted on the walls of Pompeii, in the greenhouse of the gardens of Maecenas on the Esquiline and in the Villa Livia on the Via Flaminia; and lastly, from the remains of the villas themselves. From these many sources we may obtain a clear picture of a typical villa of the classic period.

The grounds were divided into two distinct parts, the lower which was devoted to the barns, stables, dwellings for slaves and other out-houses connected with the farms and vineyards, and the upper portion where were the gardens and dwelling of the proprietor himself.

The latter was built upon a hill, where nature had provided one, or if less favorably situated a large area was raised on terraces upon artificial foundations. This arrangement had double advantages because from every terrace the eye could have an uninterrupted view and because a small supply of water which played such an important part in the landscape gardening, could be used many times in a great variety of fountains, cascades and nymphaea.

Attached to the main dwelling-house were smaller buildings, placed in suitable situations among the gardens, such as libraries, swimming pools, gymnasia, porticos and exedras. The terraces were adorned with statues in bronze and marble, while fountains and temples were so disposed as to terminate the long alleys of ilex or cypress.

The hedges of box, myrtle or laurel were carefully trimmed into walls in which doors and other architectural details were depicted. Even the pomegranates, yews, and plane trees were cut in geometrical shape, to harmonize with the spirit of symmetry which pervaded the whole.

The vines were trained over arbors of cane, supported upon marble columns, and even the violets, roses, crocuses, poppies and amarynths the favorite flowers of the Romans, were confined within beds of formal and geometrical design.

Such was the villa of the Imperial period. How closely the architects of a later day followed their models, and how few features they abandoned or invented will be seen by comparing the Renaissance villas with their classic prototypes.

When Rome was besieged by the Goths, the villas of the Campagna were deserted by their owners who took refuge in the city. Many were sacked and burned by the Goths, the others fell into ruin and decay, and what was once a highly cultivated garden became the pestilential prairie which we know to-day.

A civilization, which for a thousand years had made Rome a synonym for all that was highest in art and culture had come to an end.

Classicism was dead and feudalism reigned in its stead, and with changed conditions came new modes of life, Rome was transformed into an armed camp, men no longer had the time or indeed the inclination for learning, new buildings were no longer erected since the old ones were made to do duty as fortresses, and no others were needed.

We must pass over the centuries under cover of whose darkness Rome was battling for existence, continually threatened by her foreign enemies, and over the period when the struggle between Pope and Emperor left little time for the cultivation of other arts than those of war.

The suppression by Pope Nicholas V. (1450) of the conspiracy of Porcaso, the last struggle for municipal freedom in Rome, marks also the death of feudalism and the birth of the Renaissance. With the loss of independence the people turned away from politics to live for art and literature, so that the era of the final establishment of the Popes as temporal sovereigns of the city is also that of the dawn of the Renaissance. The spirit of the Renaissance whether we call it skeptical or analytical or merely secular—the spirit which was the exact antithesis of mediaeval mysticism—broke through its barriers and swept feudalism before it with all the force of a pent-up torrent.

All Italy felt the impulse and burst into new life. Poets, whose discouraged song, drowned by the drums and turmoil of a thousand years, had long been silent, found in love and beauty more congenial themes than wars. Scholars, whose philosophy had long been fettered by the chain of faith, no longer wrote as others taught. To the artist and the architect whose skill had been confined to the painting of a Byzantine pieta, or the building of a fortress, a new world was thrown open.

The fire of old Rome had indeed exhausted itself, but beneath the ashes of a buried city the embers still lived; at these the artist artisans rekindled the torch of learning which was to illumine the darkness of the ages and reveal a different world.

Enchanted by the beauty of the ancient models, men came to regard with aversion and contempt all that had been done from the days of Trajan to those of Nicholas V. and turned from all that savored of feudalism or monkery too indifferent to be hostile. Greek became the fashionable language of the court, and classic literature and art were the only subjects thought worthy of discussion.

In Rome Gothic architecture had never obtained a footing. The buildings which had been left as a rich heritage of classic Rome had sufficed for the needs of a much smaller city. In repairing these or in constructing new ones the invention of the architect was too greatly enthralled by the beauty and abundance of his models to permit him to become more than a faithful imitator.

Accordingly, the architects and builders, though few in number, were not unprepared for the sudden demand for new and more elaborate buildings.

No employment could have been better suited to the court of Rome. The Papal artistocracy were indolent, wealthy and fond of displaying both their riches and their good taste. As each new pontiff was created, a wealthy and powerful family was added to the aristocracy and several palaces and villas were erected to accommodate the numerous relatives of the Pope.

It is impossible to state with precision the date when it became the fashion to erect villas. A comparison of the stern façades of the early Roman palaces, which seem to have been designed with the view to resisting attack, with the light and unprotected architecture of the villas would indicate that sufficient time must have elapsed between the two types of dwelling for an important change to have taken place in the social life of the city.

It is quite probable that the great popularity which the villas enjoyed was due quite as much to the fashion of imitating Roman modes of life as to any real necessity for the villas *per se.*

THE ANCIENT THEATRE IN TAORMINO, SICILY.
From a fresco in the Burg Theatre, Vienna.

PUBLIC LIBRARY.

MONTE PELLEGRINO, PALERMO, SICILY.

SICILY, THE GARDEN OF THE MEDITERRANEAN.

WITH its vineyards, orange groves and olive trees, its pasture lands and mountain fastnesses, Sicily has been, from very ancient times, the prize and stronghold of contesting tribes and nations. And, notwithstanding the somewhat primitive cultivation of its soil, the island to-day sends out two-thirds of all Italian wines and most of the green fruits of all Italy. With its irregular coastline and its good harbors, it has attracted the fleets of ancient Carthage, of Greece, Imperial Rome, and of the Orient. It has been the battlefield of many nations, and its history, therefore, is most varied and eventful.

In the eleventh century, B. C., the Sikels, of Latin origin (from whom most likely the present name of the island is derived), crossed the Straits from the mainland of Italy and found upon the island the so-called Sikans. But three hundred years later, the Sikels were hindered by the coming of the Greeks from reaching the same independence as their kinsfolk in Italy. The proper history of the island commences with the Greek adventures in the eighth century, B. C., and the Greek history is the most brilliant of all. Art, science, poetry, all that constituted the intellectual life of the Greeks, here became naturalized. These Greek colonies became so many independent cities without any allegiance to the parent state.

In the beginning of the third century, the Carthaginians were successful conquerors; and the Marmatines (Campanian mercenaries) who had possessed themselves of Messina, invited the Romans to protect them against the Carthaginians. This Roman interference was the cause of the first Punic war, and the Romans conquered Syracuse 212 B. C. After the downfall of the Roman Empire, the island fell into the hands of the Goths; but was conquered by the Byzantines under Belisarius, and remained under Byzantine rule until the ninth century, when it was invaded by the Saracens.

Toward the latter part of the eleventh century, the Normans were successful invaders, and Roger I., son of the Norman Duke Roger, was crowned king of the two Sicilies (Naples and the island) in 1127. He was the first monarch who had ever ruled over the whole of Sicily. Through the marriage of Henry VI., of Germany, to Constance, daughter of King Roger I., the crown fell to the German Emperor, and later to his son, Emperor Frederick II. Manfred, a natural son of Frederick II., upon an unfounded report of the death of Conrad (so-called Conradin), heir in succession to the throne, and grandson of Frederick II., declared himself king. But the Popes took this opportunity to assert their lordship and bestowed the kingdom upon Charles of Anjou. Manfred died heroically, near Benevento, in defense of the Sicilies; and Charles entered Naples and later put to death the youthful Conrad. Under the rule of Charles of Anjou were enacted the wars of the Sicilian Vespers. Later, Spain, Austria, and the Kingdom of Naples have been possessors of Sicily. But in 1860 Garabaldi landed at Marsala, entered Palermo, crossed to Calabria, and marched upon Naples and annexed the whole, under the house of Savoy, to the new Kingdom of Italy.

Such, then, is the varied and thrilling history of the island to which we were sailing across the Mediterranean toward the beginning of the month of May. The morning of our arrival upon the island was a beau-ideal of a Sicilian May-day. The blue blue waters of the Mediterranean, the cloudless sky, the blue mountains appearing as we approached, the quiet early sunlight, and the fresh, sweet air—as our ship gently rode the waters, were inspirations in themselves. Palermo, in its tints of pale brown, greys, and creamy whites, and its "eretrine" trees along the Marina a mass of red blossoms, came into sight. Monte Pellegrino, in greyish blue, was on the harbor's right. With an outline as bold as Gibraltar, the mountain rose majestic from the sea. Our horizon, peacefully bathed in the quiet morning light, was the high hills and higher mountain peaks.

Gently, as we sailed the seas, the city came distinctly into view. What were mere spots among the delicate tints of the city grew to be balconied windows. The classic dome of the Cathedral stood boldly forth in the midst of all, and its Gothic towers rose high also in graceful outline.

The embarkation was but little trouble; and after a nominal examination of our baggage, we were at liberty to take the services of one of the many men waiting with their traps. Through white streets lined with balconied houses, past round-arched doors, and narrow streets, whose vista was a conglomeration of balconies and clothes lines, gay with color, stretching from house to house, and flowers and bright-eyed Sicilians withal—at last we arrived at our destination.

One thinks but little of ascending flights of stairs in Sicily, and we were soon initiated into climbing the three flights to the topmost story of the apartment house in which was situated our *pension*. But, having reached the top, the cheerfulness of the interior repaid one for the climb, and the affable manners of our English host and hostess made one feel at once "at home," and willing to dream away the days of life amidst such pleasant surroundings.

The large casement windows of our rooms opened upon the always present balconies, where flowers were freshly blooming, and one saw the sea beyond the house-tops. Below our balcony were two Sicilian house-top gardens. The floors of these were tiled, for tiles are cheap in Sicily, and where one does not find a floor of stone, either within or without a house, one generally finds glazed tiles. The effect is always clean and pretty. These gardens were no exception; and the flowers in the boxes were blooming luxuriantly, and the rose vine hung full of yellow blossoms on the white wall below. A goat and some cackling hens lent life to the garden scene —and the dark-eyed Sicilian matron and her bright-eyed laughing daughter, who, on starry evenings, took a breath of sea air from their house-top

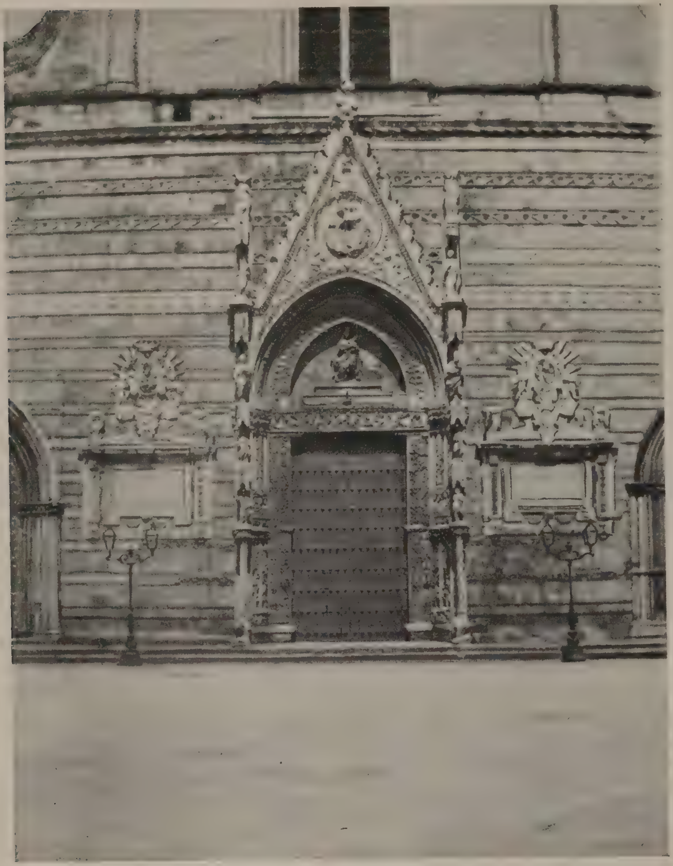
LACE-MAKERS IN POOR QUARTER OF PALERMO.

garden, were no doubt as happy, with their macaroni and flowers, their chickens and goats as their richer sisters in the villas, with the palm trees and swans, of the fair country around.

In consequence of the many different nations that have had possession of the island at various times, there is much variety in the examples of the architecture extant. The Greek has left the most beautiful remains at Selinunto, Girgenti, Syracuse and other places; the Roman many examples; and at Palermo many traces of the works of the Goth, Byzantine, Saracen and Norman are found. Of course, the Renaissance occurs in every town, and there are few fields, if any, in which to-day so many different examples remain side by side, or combined within the same building. Traces of the Classic, the Gothic, the Byzantine and the Saracenic are frequently found within the same building; and a study of the buildings themselves is closely connected with the very history of the island.

All Sicilian sea towns, however small, have their "marina," which rises from the water with well built walls and pavements, by the side of which are anchored the merchant marine or smaller boats. Where the town is of maritime importance, as at Palermo or Messina, the "marina" rises to great dignity, and is lively with the commercial business of the city. The marina usually extends along the sea beyond that devoted to its commerce, and affords a road of pleasure and of beauty.

I know not how to tell of the air of loveliness around Palermo, with its two hundred thousand and more inhabitants, its picturesque gateways, its huge Cathedral, rich in details, its three hundred churches with their treasures of mosaics and art; its gardens; its streets, where can be seen the Sicilian in all his characteristics, and then its beautiful marina, curving on the sea —the marina, where one rides, one walks, one sits or meditates and sees the waters just below rising in blue waves along the stone walls. Monte Pellegrino juts boldly forth into the



CENTRAL DOORWAY—CATHEDRAL OF MESSINA.

sky and sea, and the air is sweet with pleasant odors from the flowers of balconies and gardens. Here amidst the blue waters of the Mediterranean nature has made unto herself a garden, and the conquering nations as they have come and gone have left remains and traces of their characteristic arts.

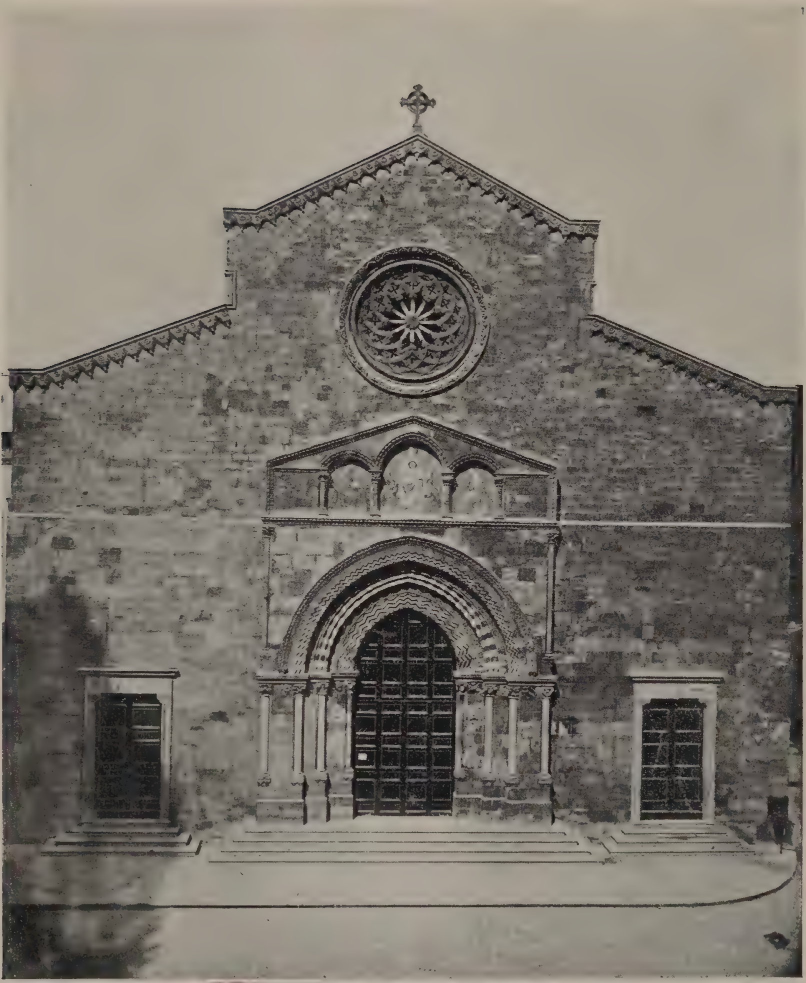
The five unadorned domes of San Giovanni Degli Eremiti, erected by King Roger, about 1132, are of the true Eastern type, and shelter Norman work of strongest Saracenic influence. And from the beautiful ruined Gothic cloister surrounding the picturesque old well and garden, the domes look truly oriental.

But with the exception of the "Cuba" and "Zisa" at Palermo, which are very generally admitted to have been erected by the Sarcens, there is, perhaps, little left of Saracenic work of older date than the Norman conquest of the island.

There are some very beautiful examples of Gothic work in Palermo—from the picturesque Gothic cloisters of San Giovanni to the more ornate cloisters of Monreale, which latter, although Norman in detail, especially in the columns, is distinctly of a Gothic spirit. San Francesco de Chiodari has a very beautiful Gothic façade, again with much Norman detail and influence, and has lately been restored. The Gothic work to be seen at Palermo, although generally with strong Eastern influence, is, with some exceptions, of simple, graceful design, with no exuberance of ornamentation. And, although the Cathedral has an incongruous later classic dome—in bold

BOSTON PUBLIC LIBRARY.

SAN GIOVANNI, PALERMO, SICILY.



CHURCH OF SAN FRANCISCO, PALERMO, SICILY.

contrast to the very beautiful Gothic bell towers, which dome was erected in spite of the remonstrances of the Sicilian architects, yet the graceful Gothic forms remaining, together with the delicate details, attest, notwithstanding the later additions, the refinement of the workers upon the building as early as the twelfth century. The old bell towers, dating from the twelfth century, and connected with the Cathedral by two arches (restored), have a very picturesque effect. The broad gable to the south portico was added in 1450, but the character of the ancient building is well preserved in the east end showing the (restored) black ornamentation.

From the Cathedral, through the Porta Nueva, is a short walk to the "Palazzo Reale" or Royal Palace. This latter has always been the site of a city castle. However, but one tower remains—the remnant of Norman times. Entering the Palace court and ascending the staircase we reach the Cappella Palatina, and are surrounded at once with all the splendors that art can give. The interior is forty-two feet wide and one hundred and eight feet long. The wooden roof, with ancient Arabic inscriptions, and distinctly eastern in its treatment and decoration, is supported by the pointed arches below, and these in turn are borne by columns of polished granite and "cipallino." Many of the capitals are of the Roman period, a prize from ancient temples long since despoiled of all their art. Mosaics of the time of King Roger I., who commenced the chapel in the middle of the twelfth century, adorn the choir. The mosaics are Greek or Byzantine, and in combination with gold and rarest marble are of unusual splendor. The wealth of mosaic is marvellous. All is mosaic, with not an inch of other on walls or floor remaining. The intricate patterns on the marble floors are only surpassed by the rich work and golden background of the walls themselves. Surely this is a royal chapel — with a wealth of art dating from the Norman period, a richness of material, and a mediaeval splendor unsurpassed by any other royal chapel. One stops and wonders if ever anything could be more beautiful, were ever marbles and porphyry more rich—could splendors of the Orient surpass them.

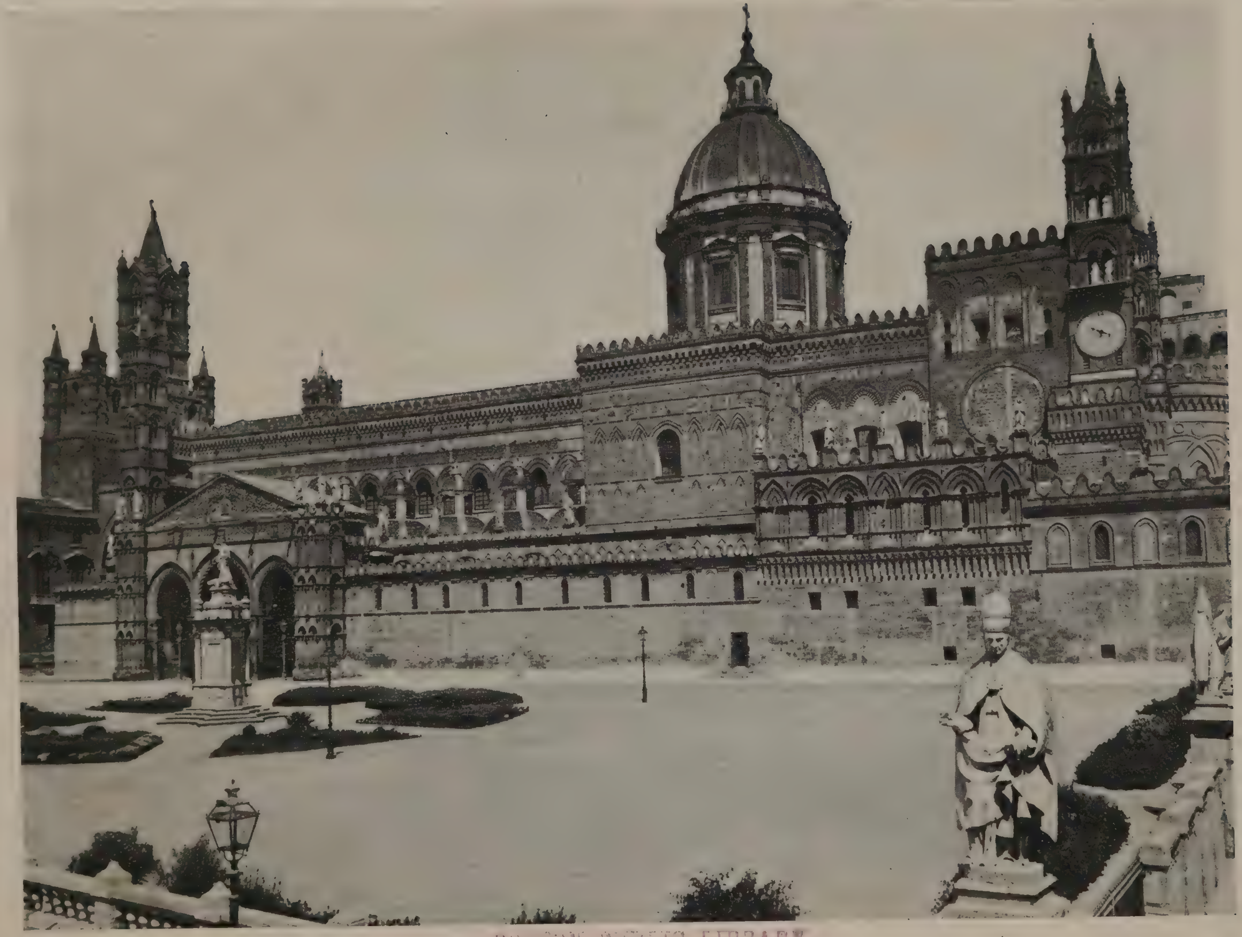
THE TOWERS OF THE CATHEDRAL OF PALERMO.

Near this chapel, so rich and royal in art, and through the Porta Nueva, the road leads to the Cathedral of Monreale (or the Royal Mount).

The road to the Monreale (less than four miles) is very beautiful. The morning of our expedition to the Royal Mount was as bright and clear a Sunday as ever shone in Sicily. The Sicilians were up betimes, and the road was lively with country folk making excursions to Palermo—that pride of all Sicilian hearts—and one of the fairest cities under sunny skies.

How different the scenes this day in May from that which occurred but little over six hundred years ago. Here, on apparently as peaceful a day, in the year 1282, occurred the very beginning of the wars of the Sicilian Vespers—the darkest blot in the eventful history of the island. It was then the ambitious Charles of Anjou, with his arrogant wife, at the suggestion of the Pope, Clement IV., had usurped the throne of Sicily, and later put to death the heir by right of succession, the youthful Conrad. For twenty years the Sicilians endured the unrighteous rule of Charles. But with no word of warning to their hated masters, they rose and enacted, on the 31st day of March, 1282, the terrible massacre of the Sicilian Vespers.

The French, whom Charles had brought into the island to rule the conquered and to sap the life blood out of those they ruled, and Sicilian men and women were on the road to Vespers. The Vesper bells were ringing sweetly, and, like a calm before the storm, there seemed to be no warning on that peaceful afternoon of the tragedy to follow. In submission the rule of Charles had been endured so long, and the hatred for him and his had been cherished so long in silence, that



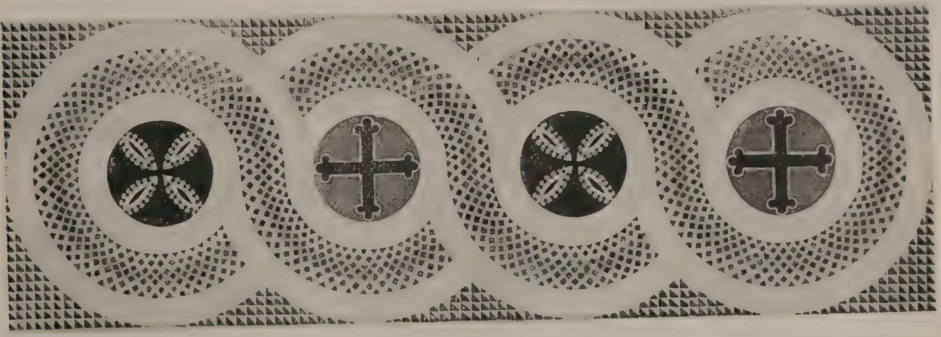
BOSTON PUBLIC LIBRARY

THE CATHEDRAL, PALERMO, SICILY.

the smouldering flame was ready to burst forth in horrid and redoubled but patriotic fury at the most unexpected cause.

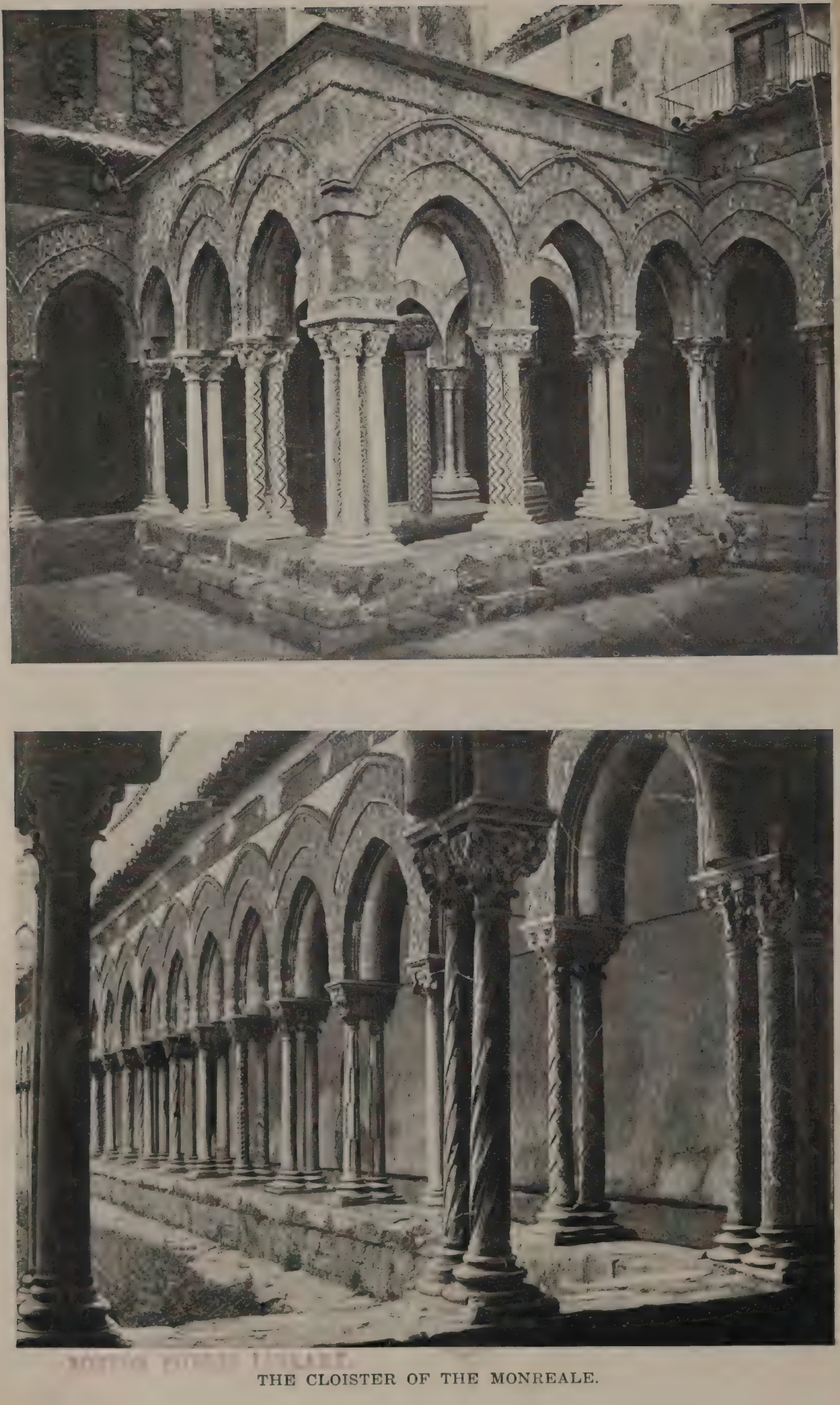
A Frenchman, so we are told, dared to insult a Sicilian lady of high degree, upon this very road; and the Sicilians one and all, as the bells were ringing out their chimes, and lighted candles were burning upon the sacred altars, arose then and there with great revenge. Two hundred Frenchmen were killed upon the roads toward Monreale; and through the night the streets and houses of Palermo were searched for the hated nationality. The insurrection continued, and soon two thousand foreigners lay dead within Palermo. The insurrection spread throughout the island; and but one Frenchman in all the number was allowed to live. Nothing saved them; priests at the very altar, monks within their cloister cells, all alike fell dead. To be a Frenchman was the death sentence. The domination of the French, and the cruel subjections of the Sicilians, could no longer keep the patriots under control. At last the Sicilians arose for their freedom, and in the very face of the Pope, and from the ringing of the Vesper bells until their successful defence of Messina, the people fought for liberty and right, and brought into the island Peter of Aragon and his good wife, Constance, the daughter of Manfred, the late king, killed in the defence of his country, and cousin to the executed and lamented Conrad. And their son, Frederick, was later acknowledged King of all Sicily.

Teeming with the memories of these incidents was the road to Monreale. Here,high on the mountain,the Cathedral stands, surrounded by a town of good size. We lost but little time in entering, and stood within a church one hundred and thirty-one feet wide, and three hundred and thirty-three feet long, and one of the most magnificent interiors in the world. The pointed vaulting (quite eastern in character) was supported by eighteen gigantic columns of oriental granite, and of exquisite workmanship. Over seventy thousand square feet of mosaic occupied every available space of the walls. The mosaics, of the Greek school, were of the richest and rarest description. The ornamental devises and the roof were Saracenic; but throughout the whole the Norman was often intermingled. However, since a fire in 1811, much of the work is a restoration. This famous cathedral was erected by William II., in the twelfth century, after the founding of a Benedictine monastery—the cloisters of which in the pointed style are rich in columns, inlaid with mosaics, and the whole one of the most superb convents existing.



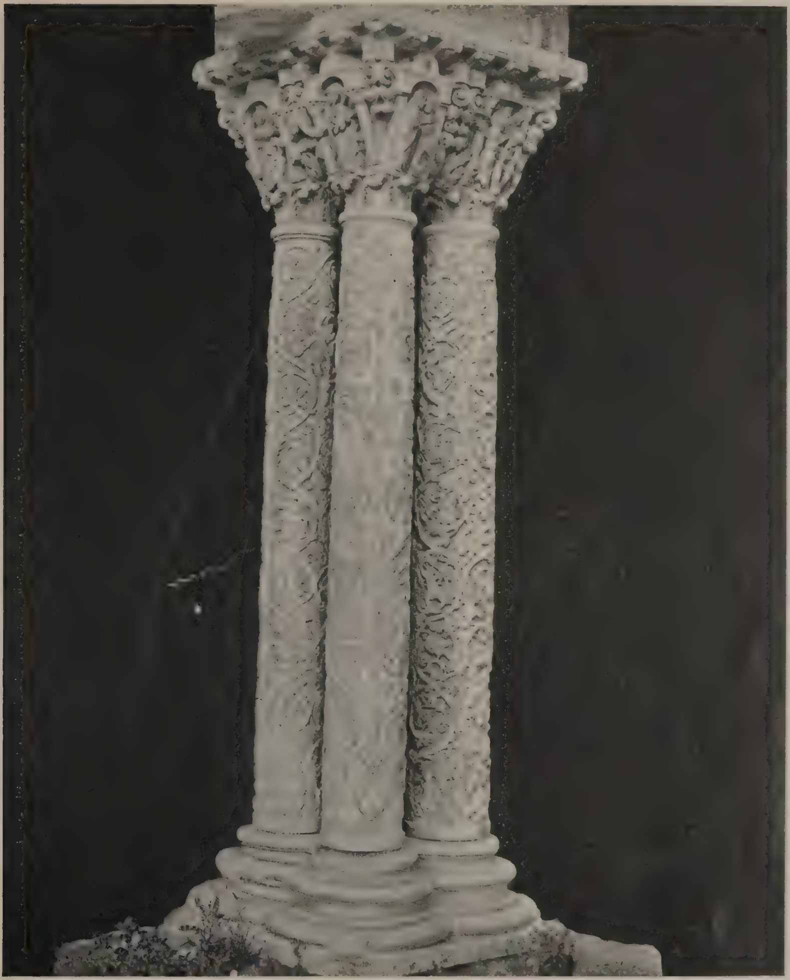
MARBLE MOSAIC—CAPPELLA PALATINA.

The cloister capitals are full of grotesque heads and figures. The pointed arches and walls are of pattern in light and dark stones, and the columns, where not inlaid with mosaics, are most beautifully carved. In one



BOSTON PUBLIC LIBRARY.

THE CLOISTER OF THE MONREALE.



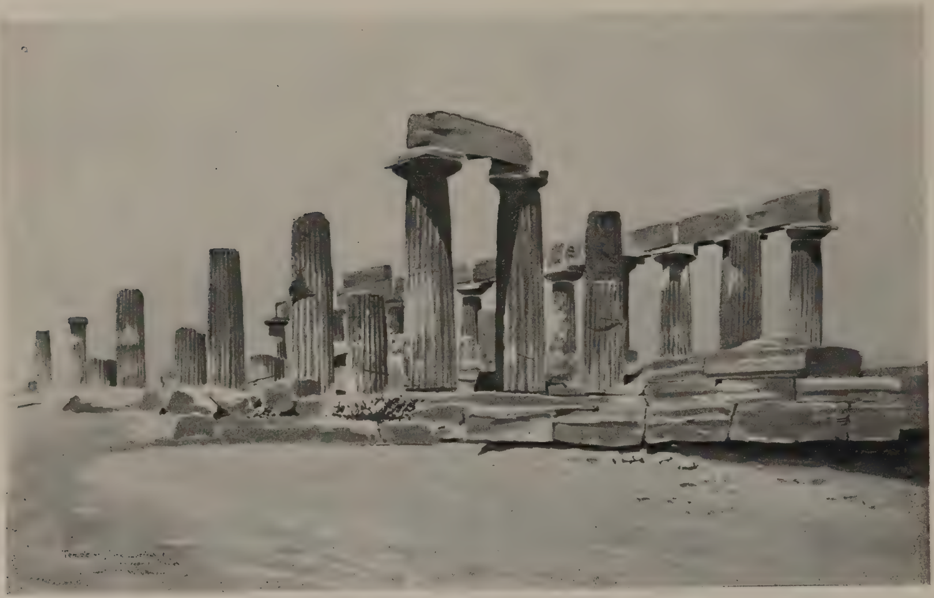
[illegible] LIBRARY

IN THE CLOISTER OF THE MONREALE.

corner of the cloisters is a fountain, placed amidst a grouping of columns adorned in the Saracenic style, which no doubt lent a pleasant accompaniment to the meditations of the Benedictine monks, as they walked among the orange trees or within the shadows of the arches.

Returning from the Monreale, it was but a short detour to stop at the "Convento di Cappuccini," in the underground corridors of which are preserved the mummified bodies of many wealthy Palermitans. The bodies, with the exception of a few fastened upright against the walls, were arranged in boxes with glass covers one above the other. In the dim light the corridors were most grotesque—and one old monk, in dusty, holy robes, stood upright with his mouth agape. It takes but a gentle touch to set his shrivelled tongue a-wagging within his open mouth. A long-bearded Cappuccin Brother took grim pleasure in showing us this gastly curiosity; and in the dead man's mouth he thrust his own fingers, and set the tongue a-going; silently it wagged, as we looked at his shrivelled skin and sunken eyes.

But we cannot remain always in Palermo, and must speed on, leaving behind us all that we have learned to love so much.



TEMPLE OF JUNO LUCINA, GIRGENTI, SICILY.

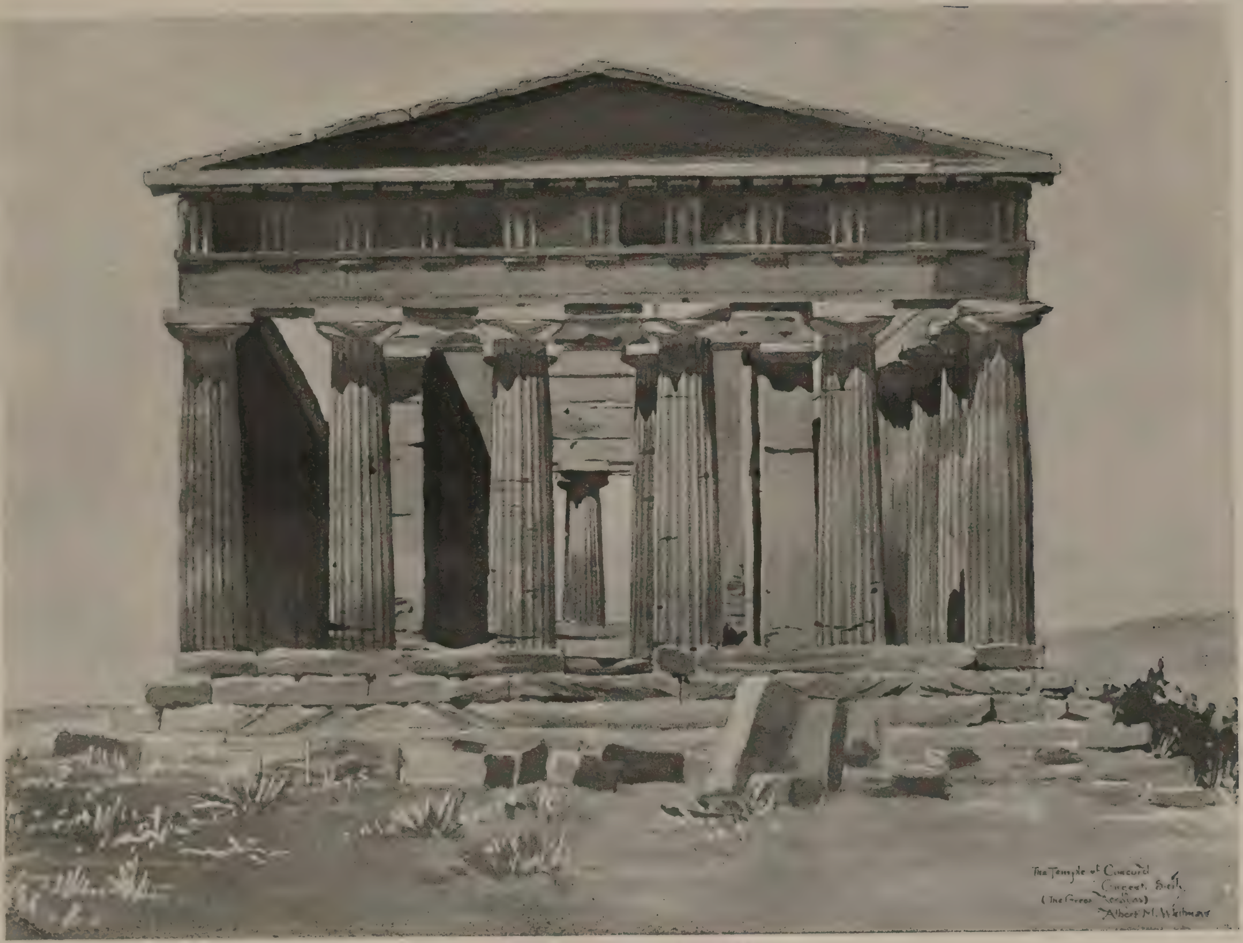
We left shortly after déjeûner for Girgenti. We were comfortably seated in a compartment of the cars with a fat German, a little English woman, her tiny dog and her big son, and innumerable traps — their belongings.

When the sun had set, we arrived at Girgenti, the ancient Agrigentum of the Romans, and the Acragas of the Greeks. The sea has receded somewhat from the ancient shore, but the lands around are still, perhaps, as fair and the sea as blue as in the old Greek days when the immortal Pindar wrote of the ancient city where dwelt two hundred thousand colonists:

> "Lover of glory, fairest queen
> Of cities raised by human skill,
> That dwell'st beside the margent green
> Of flock-frequented Acragas,
> High on the temple-crested hill,
> The fair Proserpine's chosen place."

The present town is on the old acropolis, but, by far, the objects of greatest interest are the ruined Greek temples. The finest of these are the "temple of Juno Lacinia" and the "temple of Concord." The former, situated on a precipice nearly four hundred feet above the sea, has stood since the fifth century, B. C. The temple is peripteros hexastylos, with formerly thirty-four columns of the best period of the Greek Doric order. But earthquakes and the sirocco have left but a remnant of its former grandeur. However, there is still a remnant left—and the Doric columns standing on the precipice near the sea, amidst the grass and wild flowers, are beautiful in the art of over two thousand years ago. Nearby is the temple of Concord, also a peripteros hexastylos temple, and also in the Doric order. This is one of the best preserved Doric temples in existence, and its thirty-four columns are still standing. It was once used as a Christian church. There are also the lesser ruins of the temple of Hercules, the tomb of Theron and the so-called temple of Castor and Pollux (four columns and the entablature of which have been re-erected); and the latter showing distinct traces of stucco and coloring.

But the former civilization is gone; and the beautiful remains tell us of the refinement and high state of cultivation of a nation and its colonies that made and perfected an architect-



THE TEMPLE OF CONCORD, GIRGENTI, SICILY.

ural order that has never been excelled in simplicity and beauty.

Leaving Girgenti for Syracuse we pass through an interesting country. The hue of the ground, owing to the many sulphur mines, is very peculiar. For miles one sees sulphurous greens; but the colors are pleasing, and the scene a novel one. At evening we arrived at Syracuse, once the most important town of Sicily and the most important of all the Hellenic cities—but now only a remnant of its former greatness. With a stirring history of over twenty-six hundred years, it has been the prize of contesting nations. At first a Phoenician settlement, it was founded in the eighth century, B. C., by the Dorians and Corinthians. The Greeks and the Romans have fought for it, and in later years the Arabs and the Normans, and all in turn have conquered and been conquered. It was in the reign of the King Hiero II. that Syracuse rose to the highest pitch of glory it ever attained. In his reign lived Archimedes, the mathematician, the first to establish the important truth in physics that a body plunged into water loses as much of its weight as is equal to the weight of an equal volume of fluid.

TEMPLE OF CASTOR AND POLLUX, GIRGENTI, SICILY.

Theocritus was born at Syracuse, and lived at the brilliant court of Hiero II.

"The sweet Theocritus, with softest strains,
Makes piping Pan delight Sicilian swains,
Through his smooth reed no rustic numbers
move,
But all is tenderness and all is love,
As if the muses dwelt in every vale,
Inspired the song and told the melting tale."

The modern town (which occupies but a small part of the ancient town) is most beautifully situated upon an island connected with the mainland of Sicily. The seas at times dash wildly up against the stone walls and parapets. The modern town itself has nothing in it of especial importance. However, it is very picturesque and quaint; and the bits of mediaeval doorways and windows now remaining are very interesting, the immense voissoirs of some being a noticeable and pleasing feature. The shady, narrow streets are in great contrast to the sunny seas around. The country around Syracuse is of pastoral beauty, and the road to Fort Eurelus, which latter stands at the extremity of the ancient city, is splendid with waving golden grain and verdant fields, with red poppies and great yellow daisies bordering the roadside, and giving notes of bright color among the greens and goldens of the grasses.

A DOORWAY, SYRACUSE.

Fort Eurelus is where the north and south walls, erected by Dionysius, converge. It terminates in four great towers—flanked by two deep fosses, hewn in the rock. From one of these fosses a number of subterranean outlets are connected with each other, and form passages accessible not only to infantry but to cavalry as well. The "Greek Theatre," on a hillside without the present town, was the third largest of its kind erected. It was hewn in the rock in the fifth century, B. C., and is semicircular, and four hundred and ninety feet in diameter. There were, perhaps, sixty-one tiers of seats. Near this theatre, on the upper part of the hill, is the "streets of tombs," cut also out of the solid rock. But no longer sleeps anyone within. The tombs have long ago been despoiled of all their decorations. No trace is left of the cultivated audience that once sat within the theatre — except King Hiero and Queen Philistis, whose names are still traced upon the stone.

How easily our imagination can picture here the multitude listening to the plays of Greece, near the beautiful Ionian sea!

One of the most interesting sights of Syracuse are the Latomie or ancient quarries, from which was taken the material for the ancient city. The two principal ones are the "Latomia del Paradisö," and the "Latomia dei Cappuccini." The former has been hewn in the rock to the depth of one hundred and twenty feet, and now, with the luxuriant vegetation that has sprung up, looks like a work of nature. One imagines himself in a wild ravine, with the rocks rising in picturesque and grotesque masses around him. Here in the Latomia del Paradiso is the so-called "ear of Dionysius," a grotto hewn in the rock in the form of the letter S. It is two hundred and ten feet long and seventy-four feet high. It contracts toward the summit and forms peculiar acoustic properties. From an opening in the top one can hear a whisper at any point in the interior. This ear is supposed by some to be one of the prisons erected by Dionysius in order that he might detect any conversation among the prisoners.

Near the Latomia dei Cappuccini is the church of San Giovanni and the Catacombs of the same. Both date from about the fourth century, A. D. The catacombs are very extensive and among the most interesting in existence. There is comparatively little decoration left within them; but the large circular chambers are a peculiar and an unique feature. The church of San Giovanni contains a most interesting crypt which dates from the fourth century. Here are remnants of capitals and pillars of an ancient Greek temple. A most beautifully carved Greek Ionic cap is used reversed for the bishop's chair—the volutes forming the arms. It was in this crypt that St. Paul is said to have preached on his way to Rome; and the faithful may believe they see the very spot on which he stood.

In Syracuse the great temple of Jupiter Olympium (Cicero informs us) was erected, but not a vestige remains unless we except the broken shafts of two columns.

As we leave the walls of Syracuse, and follow the border of the Ionian sea, the snowy peak of Aetna grows larger and greater until we reach Catania. There are few cities with a more stirring history than Catania. It was founded by Chalcidians in 729, B. C. By wars and earthquakes it has suffered greatly, and there was little of antiquity left after the great earthquake of 1693, since which time the present town has been rebuilt. The inhabitants have in turn been transplanted to other parts, as in the time of Hiero I., and have been reduced to a state of slavery, as in the time of Dionysius. The Goths, Saracens, and Normans have fought for the city. The first Sicilian University was founded here, and Catania was long the literary centre of the island. With all its varied history, Catania is to-day, although not rich in historic monuments and works of art, a well-built city, second only in population to Palermo.

There is a Greco-Roman theatre in

Catania that is very impressive. Only an imperfect idea can be obtained of it, for it is mostly underground. One can trace the tiers of seats and see, at places, the pure white marble of the graceful seats remaining, while the houses of the modern town rise in picturesque confusion over the very top of the ancient structure. The Benedictine monastery of San Nicolo at Catania is extensive and covers twenty-one acres of ground.

Aetna, the landmark everywhere, is most impressive from Catania and its environs. From the streets themselves Aetna towers over all in majesty and glory. The clear atmosphere, the brilliant sky, and the snowy peak of Aetna will always make Catania delightful.

Comparatively speaking, the Sicilian is poor, and therefore deserves all the more credit for his hospitality and generosity so often shown. Of course there are Sicilians and there are Sicilians; as also there are Americans and Americans. But a Sicilian's kindness is amazing, especially when one considers (what seems to us and which often is) the small amount within his pursestrings. To a stranger he is courteous and kind to an extreme. He will allow a stranger, if he be a guest or a friend to pay for nothing while in his company. "Oh!" he will say, "We are in Sicily, and I'm a Sicilian!" Those are his oft repeated words. His friends, from other cities or countries, he considers always his guests. Although he might have to stint himself for days thereafter, he will give his friends the best his larder can possess. But it may be mentioned here that an American who always longs for the luxury that surrounds him at home to accompany him abroad and who cannot take pleasure and interest in anything unless done as he or his countrymen would do it, had better remain forever away from Sicily; for he cannot be congenial to the Sicilian and the Sicilian will not be congenial to him. In no country is the saying so true that "When in Rome, do as the Romans do." One must not go to Sicily, as some one has said of another country, to pick motes out of bright eyes, or, as I shall say of this, to find fault with those who are our peers in courtesy and gentle manners. Luxury, after all, is a relative term. A mechanic's luxury would be to see and learn in some of our great machine shops; an artist's luxury, to walk among the very kind of towns and scenes that Sicily possesses.

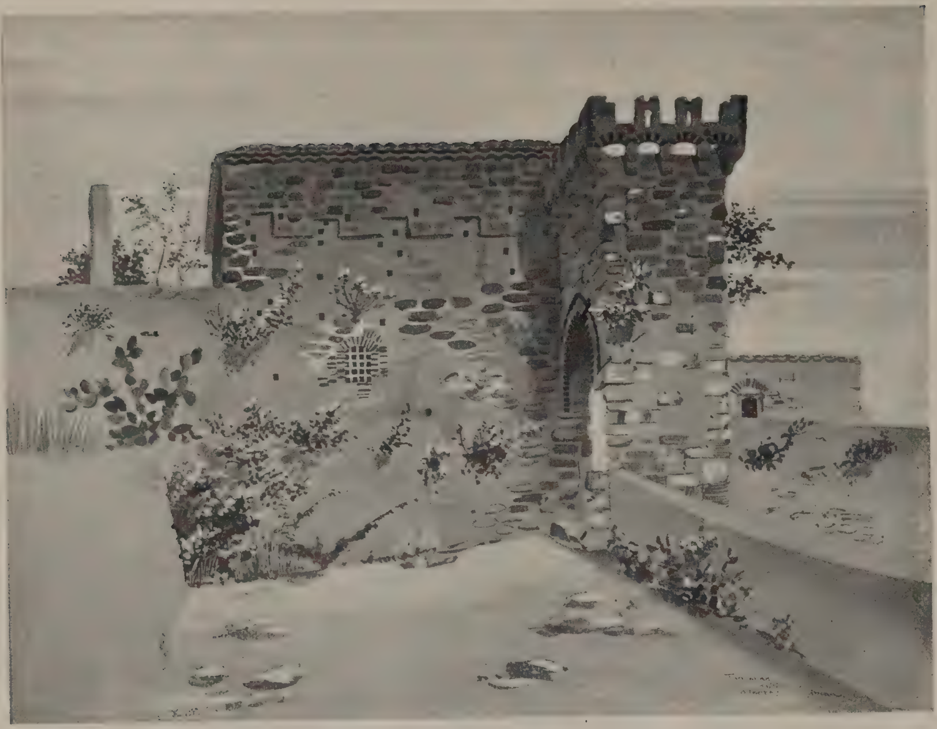
The first time I was invited to a Sicilian home to dine, the remarkable advice "not to eat any breakfast," was given to me. As dinner was at four in the afternoon, I replied that I should become very hungry. Again, I was told that if I ate much in the morning I would be unable to eat any dinner. A roll and a cup of coffee is rather a light breakfast for an American; so long before dinner, the pangs of hunger had overtaken me; but long before dinner was over the pangs of hunger were thoroughly satisfied. During the course of the dinner, I began to understand why my friend had advised me to eat nothing beforehand. I soon learned from a Sicilian lady next to me that a guest was expected ("out of compliment to the host and hostess") to eat more than anyone else at the table. The lady on one side and my friend on the other kept telling me, as each course was served: "Oh! but you ought to take more, even if no one else does, or you will offend the hostess." In the early part of the dinner this was all delightfully pleasant, but toward the latter courses, having followed the advice of my friend, I found I was at my wits' end to know what to do, as wine and dainties in succession followed.

We, therefore, left Catania with happy memories of a kind and pleasant people, ever thinking of the flowers and hospitality, we, perhaps, might never see again.

Our destination was Taormina.

The railroad skirts the sea, and the scene was ever changing and always beautiful. With Aetna always in sight, we rode past ancient lava streams and orange groves, and pitcuresque Sicilian towns and finally arrived at Taormina, at one time one of the most cel-

THE THEATRE—TAORMINA.



THE CITY GATE FROM ROAD TO GIARDINI AT TAORMINA.

ebrated cities of all Sicily. It was the last of the Sicilian cities to yield to Saracen invasion; and only after a siege of eight months it surrendered to the enemy. And in the time of the Norman invasion, a siege of six months was held around its ancient fortifications. The town itself is three hundred and eighty feet above the station of Giardini. A road winds picturesquely up the hill to the quaint old town. With our luggage we seated ourselves in the trap awaiting us. Up, up we rode the tortuous road. Great prickly pear grew along the roadside; orange trees perfumed the air; and dirty children ran out from behind stone walls and hedges, begging for soldi. Donkeys, with ladened panniers, were trudging up and down, and boys and men, the very perfection of Apollos, were accompanying them. Up, up our horses pulled, and at every turn the scene grew more beautiful, and Giardini, with its straggling houses, grew smaller, and the expanse of sea grew larger. Up, up, and at last we reached the city gate, a mediaeval structure, picturesque with greens and prickly pear. Almost on level ground we entered the town itself. I was going to say we entered the middle ages.

Centuries had not seen a change within the city gates.

Women and children, physiques erect, still carried, as in the days of old, great water jugs of graceful outline, upon their heads, and went to picturesque old fountains for crystal water, fresh from Aetna's snows. Our carriage, with things of beauty on every side, rattled through the mediaeval street. To our left the town climbed up the hill, to our right below us was the sea. Fine old doorways, with decorations that were works of art, in every detail, some of Renaissance and others Gothic, we passed on every turn. We began to feel that the hands of time had been turned back to mediaeval days, for there was noth-

BOSTON PU... LIBRARY

TAORMINA.

ing here to mar our delusions. At last we arrived at what seemed to be the end of the street, and where were the gates of Hotel Timeo. Our smiling, bright-eyed, dark-mustachioed host greeted us cordially as we alighted. The hotel commanded a view unique, and there is none more beautiful in all the world, and stood next the ancient theatre.

The theatre was of Greek origin, but owes its present form to the Romans. It is also one of the best preserved ancient theatres in existence, and commands a view unequalled. The theatre was so perfect in its acoustic properties that words uttered in a low voice in the proscenium were distinctly heard at the top of the tiers of seats.

The morning light and evening shades are ever varying. One evening I remember a glorious sunset colored all the scene. The storm had passed, and the horizon clouds had deepened to a purplish grey, until they touched the purpler sea below. The clouds above, lit with a rosy hue, reflected pinks upon the blues of waters near the shore. With orange trees and cypresses, the rocks held up Taormina high above the sea; and the hill of Mola, with its town perched on its very peak in precipitous height, and in its emerald green, rose higher still above Taormina. The castle wall was tinged with pink, and Mola's houses were a thousand tints against the reddened sky. Beyond the Corinthian columns of the theatre lay the valley of the Alcantara and the mountains of Castiglione, in gay attire, and great Aetna from the sea of blue and pink had snow fields faintly red. With a blaze of glory, the setting sun sank beyond the mountains, and great shadows hid a scene of unsurpassed beauty. The town grew quiet in the evening shadows—save for music of guitar and sweet Sicilian voices. The air was freshened by the ozone from the sea; and Aetna, silvery white, was high among the stars and fleeting clouds.

We left Taormina and the most beautiful surroundings of all Sicily, and following the Ionian sea we reached Messina.

Here ended the wars of the Sicilian Vespers in the memorable siege when Messina was attacked by Charles of Anjou. The whole island from one end to the other had been stirred to the highest pitch of patriotism, after the successful rout of the French—and all alike were willing to risk everything for their country's sake. None were more brave than the citizens of Messina. In those memorable days the wives and maidens took part in the defence of the city. Women of high degree, with their lowlier sisters, carried stones and combustibles to hurl at the enemy. In fact it was a young woman who first gave the alarm of attack, and she hurled a huge fragment down and killed several French soldiers; and another, her companion, set the bells ringing, and Messina was saved, and the way opened for the entrance of their chosen Constance of Arragon.

Owing to the many vicissitudes this city has sustained, both from the hand of man and nature, the town retains but few relics of antiquity. The most interesting object in Messina is its cathedral. The latter was begun in 1098, but it has been so changed and modernized that but comparatively little remains of the style of the original. The best part of the structure is the lower part of the façade. This is Gothic, and is very beautiful in the treatment of the style, suggesting the style as treated at places on the mainland of Italy. Its principal characteristics are its fine detail, proportion, the horizontal flat bands of inlaid marble, and the scheme of coloring so effectively produced by the latter. The general result is most chaste and artistic, but the pediment over the principal entrance is a later addition. The two Renaissance tablets between the doors, although not bad in themselves, are incongruously out of place. The bands upon the façade become larger, and the design less intricate, as they approach the top; but nowhere, owing to the variety of design and delicate coloring, do they become monotonous. Black and white marbles are freely used in combination with colors, and the treatment is everywhere delicate. The widest horizontal band, as it were, divides the front vertically into two parts, the upper part being one-half the size of the lower part. In the same proportion are the doors; the centre one being about one-half as high again as each of the other two. The coloring on this façade produced by the designs in marble is one of the most beautiful effects in Sicily. We would wish that the whole façade had been carried out in the design of the lower part. What has already been done in this Gothic work is so exceedingly beautiful that the work above it appears very mean and clumsy in its heavy classic forms and details.

The harbor, one of the finest in the world, is always busy with traffic. Boats in all direction are plying across its waters. Bright-eyed Sicilians are working hard with the incoming and outgoing cargoes. Great lumbering carts rumble along the wharves, and boatmen, in gaudy red caps, and fishermen lounge about upon the piers. Horses in harness of bright colors, brass and feathers, pull wagons painted in all gay colors and with scenes from the lives of the saints depicted thereon, and the woodwork of astonishing design. Women in gay dress vend fruit and flowers.

The café doors are open, and with the odor of the cigarettes is mingled that of the ever delicious chocolate and coffee. The macaroni hangs out in the sun, and whole shop-fronts, with the same on long poles, are covered; and the ceilings within are obscured by its presence. Small children and hungry beggars look longingly up as it dries in the air, while swarms of flies blacken its surface and eat up their fill in peace and content.

A lady I became acquainted with in Sicily most aptly described the island: "In the beginning," she said, "God created everything, but when his hand became more cunning, he paid more attention to detail, until at last he made and finished Sicily—His most beautiful masterpiece."

And so we leave the land of Grecian temples, and the flowers and orange blossoms, and the blue hills and mountain peaks under the sunny skies and sail away into the seas. Sicily, like an ever-beautiful dream, fast melts into the blue waters, and Aetna's peak is faintly white above the vanished isle. At last the distance veils it all, and nothing is left to us but the azure of the skies and seas.

Albert M. Whitman.

CORNER HOUSES IN PARIS.

IN our modern cities, where the municipal authorities, scrupulously respectful of the equality of the inhabitants, too often forget that the equality of all means the liberty of each; where the regulations relating to public ways, inflexible though antiquated, form barriers to private initiative and cause our streets and avenues to be bordered from end to end by long, unvaried ribbons of stone, any innovations on the part of architects, any attempts to modify the appearance of our buildings and make them more attractive to their occupants and to passers-by, are kept within the very narrowest limits.* What, indeed, is to be done when the height to which houses may be built and the distance to which their exterior projections can extend, are fixed by the terms of a regulation, and when the municipality, without whose license one stone cannot be placed upon another, decapitates every daring summit and lops off every exuberant ledge? Confined in this manner, above, in front, and on each side, how is it possible for the outline of a house to offer any novelty; how can it differ from its neighbors, unless it be by the style of its decoration, by ornamentation more or less bombastic, which frequently appears misplaced because one feels that it is only veneering—that it might be very different from what it is, and that it is in no wise needed for the setting-off of the architectural features of the edifice?

But, though the monotonous uniformity of so many of our large public arteries is partly imputable to the requirements, theoretically justifiable no doubt, of a too paternal Highway Board, it is not always due to this cause alone. In the case of apartment houses, which are the only ones now under consideration, it is certain that owing to the duty incumbent upon the architect of providing the greatest possible amount of house-room and the natural obligation of placing the larger number of windows in the part of the house looking out upon the street, with the consequent distribution of spaces and solid parts, he has very little latitude left to him for innovations. Even if he had any inclinations in this direction, the landlord would not be likely to give him any encouragement. As a rule, a landlord wishing to erect an apartment house fights shy of architects who want to produce something architectural: he merely requires that the house should be built, for, in matters of art, the public are now so well educated that they know architecture and housebuilding are two different things, and for the former it is the landlord who pays, while it is the architect who reaps all the glory.

One of the rare occasions in house-construction on which an architect is able to introduce a little architecture—reducing the term to the sense attributed to it by the close-fisted landlord—is when the ground upon which the house is to be erected is located at the intersection of two streets and can consequently present two faces instead of only one. The edifice then becomes a complete thing, being no longer a mere slice of a block of buildings, so that the architect's talent, if he has any, finds scope to display itself. This is why it has occurred to us that it would be interesting to see, by the inspection of a few recent examples, what French architects have been able to do of an original character in later years, and to devote these few pages to a study of corner houses, confining ourselves, of course, to apartment houses, those for which a uniform programme is laid down, which may always be summarized thus: provide the greatest extent of accommodation obtainable, in order to produce the highest possible amount in rentals.

---

*The author here, of course, is referring to Paris and to other cities of the European continent—Editor.

We should like to go back to former centuries and see how our ancestors managed in this respect; but, in the first place, apartment houses are things of quite modern invention, like the enormous increase in land values, which necessitates paying for the ground alone a price that would formerly have sufficed for the erection of a palace, and entails, in consequence, increased height in order to make up for the space impossible to be had laterally; secondly, in those much maligned days of yore, the civic powers were far more lenient than they are at present, and left every man free to lodge himself as he saw fit. Houses of several floors did exist, it is true, but they were in each case occupied by a single family, and a few boards did not then, as now, form the only separation between beings utterly indifferent to one another, or perhaps enemies, passing their lives side by side without ever meeting face to face. When a house was located on a corner, this position used to be utilized by the construction of a winding staircase, which, from the first floor upwards, overhung the sidewalk. By way of retrospect we give an illustration (Fig. 1) of a charming specimen of this style, dating from the fifteenth century and still standing in the old Marais quarter, at the junction of the rue Vieille du Temple and the rue des Francs-Bourgeois. This system was a very rational one, considering that the starting point of the staircase, for the use of a single family, was situated inside the dwelling. The projection thus commencing only above the basement, the whole of the corbelling was gained from the street, whereas if the stairs had been required for several distinct families, it would have been necessary to make the turret start from the ground in order to establish an exterior entrance to it.

This corner arrangement, consisting of a small overhanging staircase winding round a central newel, was perfectly logical: it is, perhaps, less so when the staircase runs round a well starting from the ground. We have an example of the latter in a contemporary edifice, le Cercle de la Librairie (Publisher's Club), erected by M. Charles Garnier, on the corner of the Boulevard Saint-Germain and the rue Grégoire de Tours. It may be that in adopting this arrangement the eminent architect of the Paris Opera House allowed himself to be guided by his partiality (justified by success we admit) for staircases of magnificent proportions; but, however great the talent displayed, the dimensions of this staircase appear excessive in comparison with the size of the edifice itself. Employing the well-known description of a canon, namely, a hole with some metal around it, we might say of the Cercle de la Librarie that it is a staircase with something at the top. But what is perfectly admissible in the case of a great public edifice, not intended for habitation, and which calls for a certain ostensation of style, is less justifiable in domestic architecture—in the great majority of private buildings which form the subject of this article.

Our public thoroughfares, which all run in a more or less straight line, traverse one another in such a way as to form three kinds of angles, viz.: obtuse, right, or acute. It goes without saying that the shape of the plot resulting from these three different angles determines the manner of planning the house to be erected thereon. An obtuse angle, when only a slight one, is manifested by a simple deviation of the frontage, which appears broken. The bend is necessarily a solid part, merely uniting two portions of façade and gives little opportunity for any specially interesting arrangement. We present a good example of this kind of corner in Fig. 2, being a house lately erected in the Avenue Henri Martin. It is just the average kind of house met with in our large avenues; there are many like it and the sole difference between one and another consists in the greater or less profusion of sculptural ornamentation, distributed over the front.

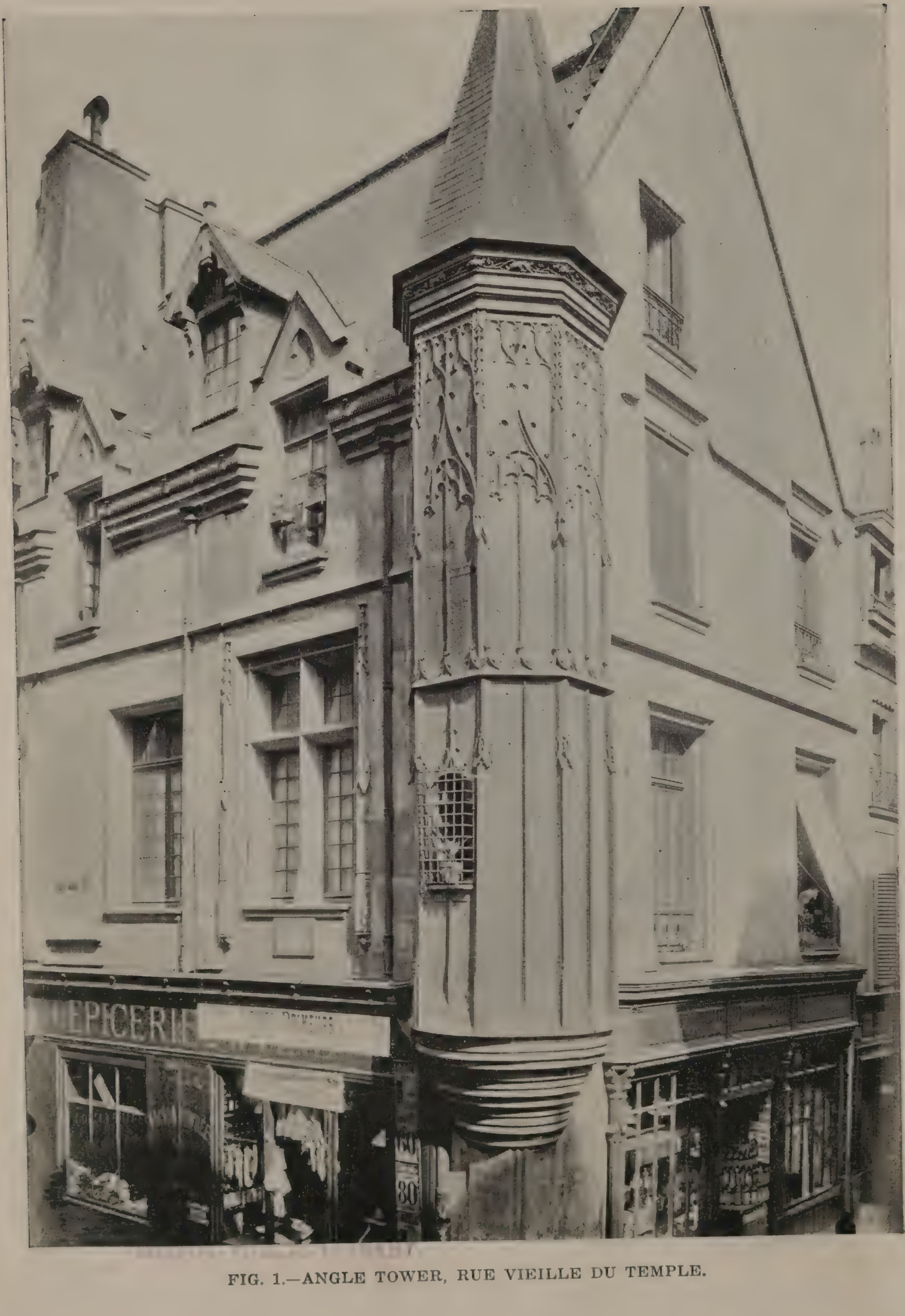


FIG. 1.—ANGLE TOWER, RUE VIEILLE DU TEMPLE.

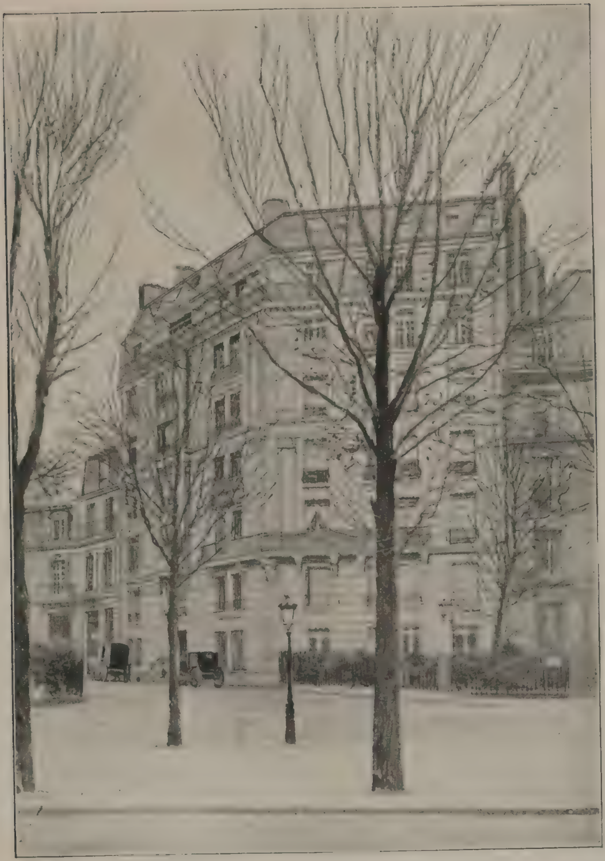


FIG. 2.—APARTMENT HOUSE, AVENUE HENRI MARTIN, PARIS.

When the angle is a right one, which is most frequently the case, three courses can be adopted: retain it, cut it off, or round it. In practice, the angle is scarcely ever retained, and it may be said that the first hypothesis is never realized, as, this position at the crossing point of two streets being a particularly agreeable one, it would be unwise not to profit thereby and obtain a view by placing a window there. Cutting off the corner is, therefore, the plan most generally followed, especially for houses located on streets of moderate width, where the process of rounding, to be touched upon presently, would require more space than could conveniently be spared. According to the size of the room placed on the corner and the consequent amount of light required, the architect slices off a larger or smaller portion of the angle, so as to admit of putting one, two or even a larger number of windows. When the corner is cut off in this way to a considerable depth, the front obtained is really the principal part of the façade, the returns being merely accessory parts. All the private mansions surrounding the Arc de Triomphe, on the Place de l'Etoile, have their fronts formed in this manner, with the triangular piece of ground before the house—which we may call the product of this slicing-off process—made into a tiny garden, separating the house from too direct contact with the public road. This is a very pleasant arrangement, but involves too great a sacrifice of ground to be frequently adopted.

A house in the rue François Premier in the Champs-Elysées district

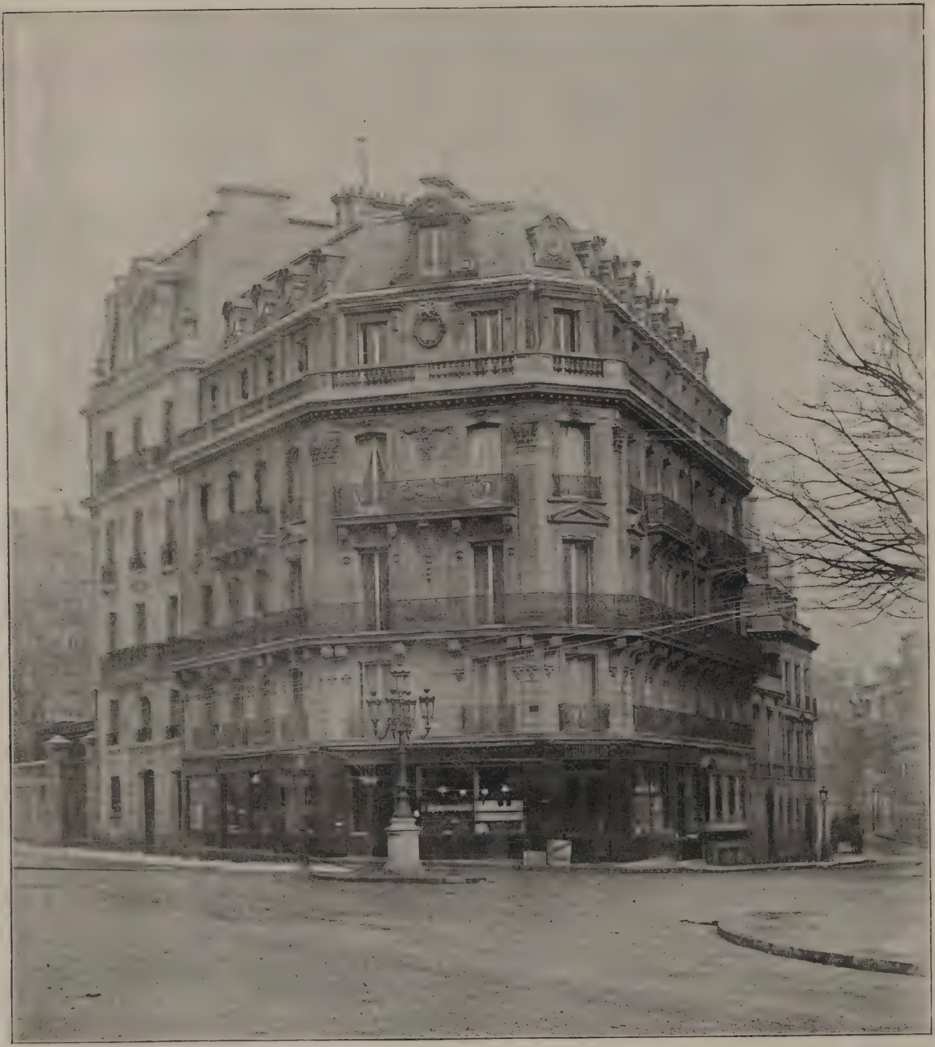


FIG. 3.—APARTMENT HOUSE, RUE FRANCOIS PREMIER, PARIS.

(Fig. 3), shows us a modification of the method just described. As will be seen, the architect seems to have taken pleasure, and we cannot blame him, in varying as much as possible the shape of the rooms of the house by putting two faces on the corner, one having two windows and the other, not so large, with one window.

In order to see the latest achievements of architectural art in the domain of house-building one must always examine the districts that extend towards the west of Paris, between the Seine, the Champs-Elysées and the Bois de Boulogne. In this neighborhood, where grass was still growing a hundred years ago, apartment houses are springing up daily, filled with the newest appliances contributing to comfort. The rentals of these houses remain relatively within reach, for, notwithstanding the complaints of bad times emitted by architects and builders, it is not that the number of new erections has diminished, but that constructors have multiplied so that they now do a less profitable business.

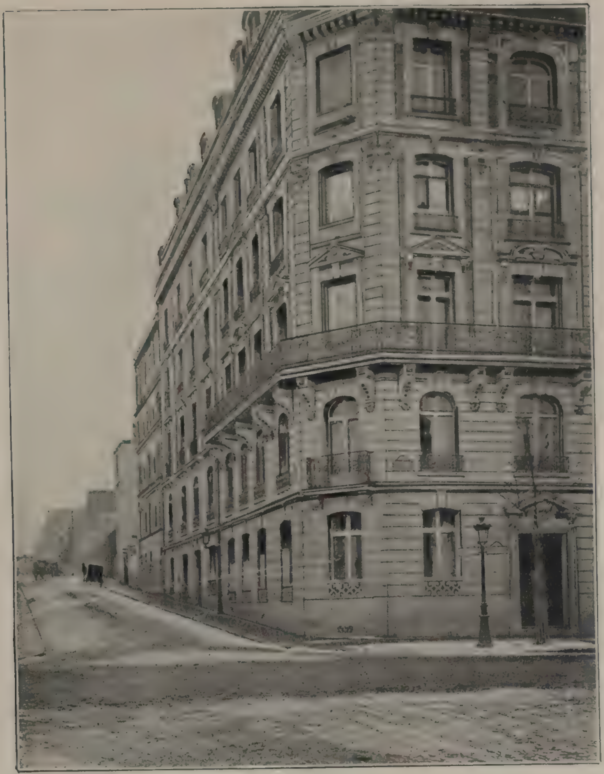


FIG. 4.—APARTMENT HOUSE, RUE DE VILLEJUST AND AVENUE VICTOR HUGO, PARIS.

Three houses in the Avenue Victor Hugo, quite recently completed, give us three types of one and the same arrangement. We will not pause to speak at length of the internal disposition, which varies but little in apartment houses: There is always a large and a small drawing-room, a dining-room, from two to five bedrooms, sometimes with, but more often without, dressing-rooms, a bathroom, an ante-chamber, a servants' room and a kitchen. That is all very well, and it is quite possible to live comfortably in one of these flats, especially if the master's occupations keep him out of doors all day, for we must note here, in passing, that in a flat it is always the master who is sacrificed. Madame has one or two salons in which to pass her time, but there is no study or working room for Monsieur; if he desires one he must make shift with one of the chambers intended for bedrooms, as the architect has foreseen nothing for him. He may some day become less of a cipher in the household, and may be provided with a cabinet opening into the drawing-room, where his visitors could wait. After this little complaint pro domo mea, which it is not a bad thing to make from time to time, without much prospect, however, of changing deep-rooted habits, we will say that we freely approve of the rule, in the case of corner houses, of giving the drawing-room the best position. The three examples that we here offer follow this plan, as, in each, the drawing-room has a view on three different sides. Certainly nothing is better calculated to brighten a room; but this agreeable effect is not obtained without interfering with the furnishing of the room. In effect, the abundance of windows on three sides leave but little wall space, except on the side facing the middle window,

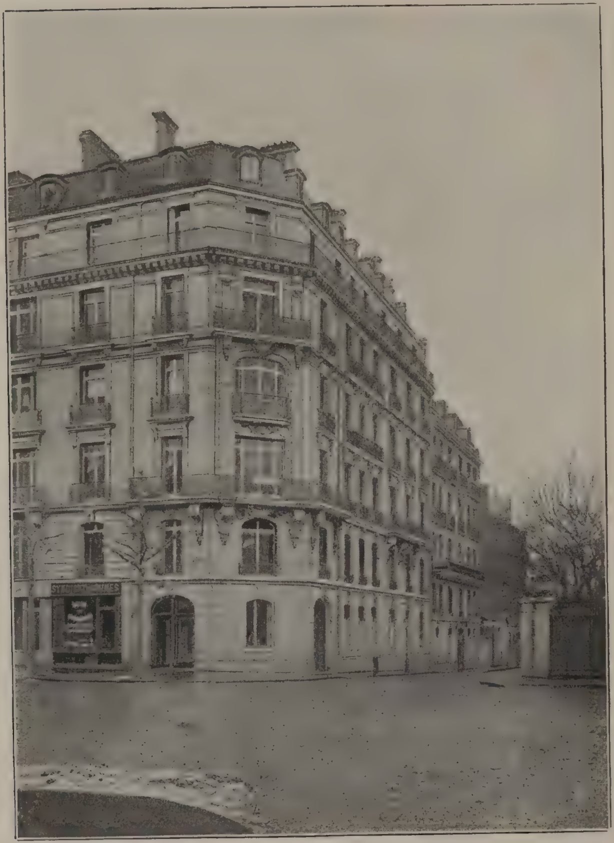
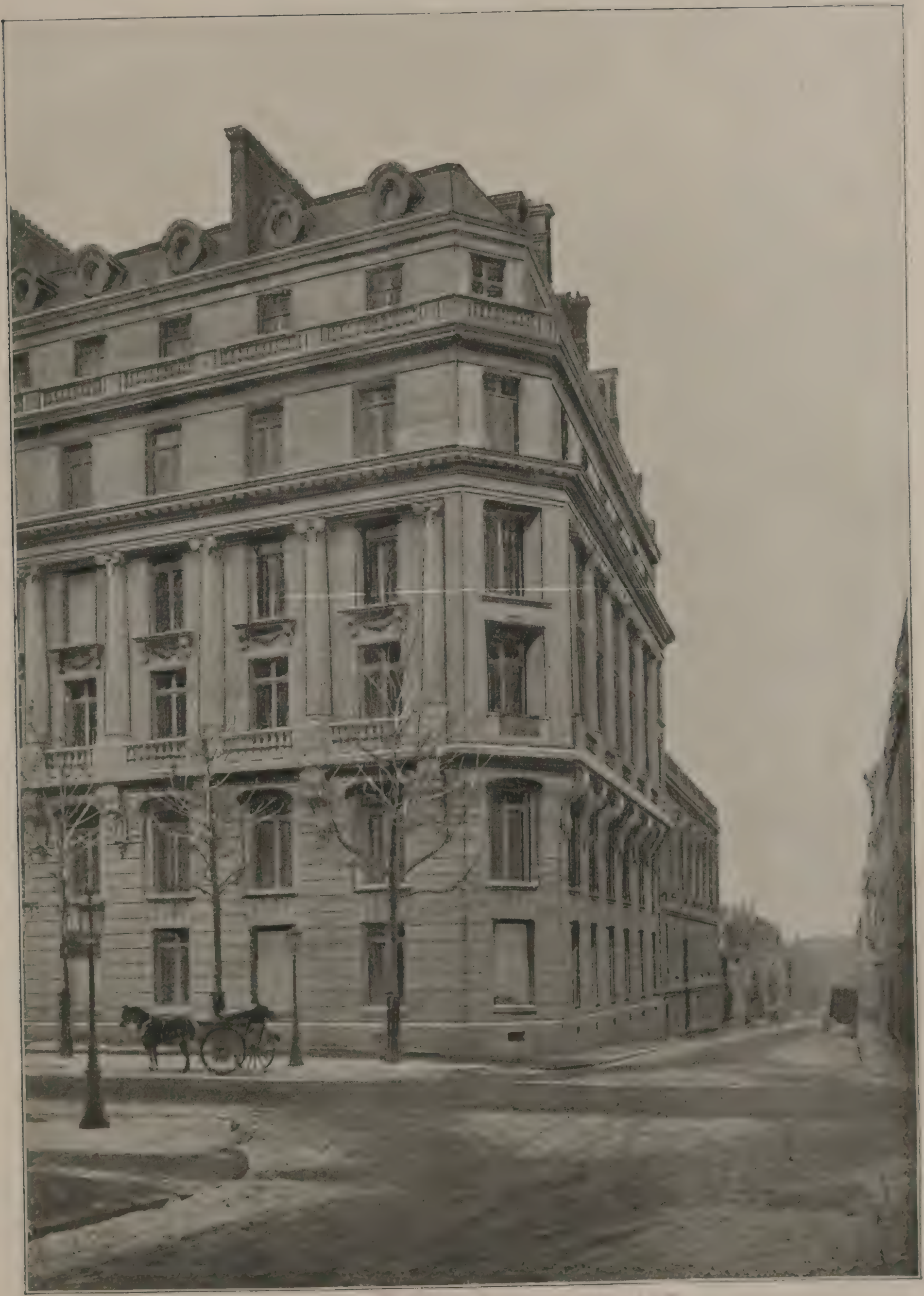


FIG. 5.

and even this is usually occupied, in its central part, by the fireplace, which is flanked right and left by a door leading to the two sides of the house. Therefore, in a room of restricted dimensions, whose walls are pierced with three windows and two doors, to say nothing of the parts taken up by the windows and door hangings, what space is there left for the furniture? This is a serious inconvenience to people who delight to surround themselves with those personal objects that give an individual stamp to a room and distinguish it from ordinary, commonplace apartments. In order to avoid the drawbacks, while profiting by the advantages of this kind of room, the architect has in many cases, and wisely, we think, stopped up the corner window by raising its blocking course breast-high and putting a fast, unsilvered mirror in place of the French window. This plan has a triple advantage; daylight enters the room as before, while a piece of furniture can be placed underneath the glass, and outside, especially if there is a balcony running round the apartment, flower-boxes can be so disposed as to surround the bay with a frame of verdant climbing plants. The house which stands at the angle of the Rue de Villejust and the Avenue Victor Hugo (Fig. 4), presents an example of this arrangement. As an illustration of the opposite disposition we have the house shown in Fig. 5, where the glazed space has been increased by dividing the corner window into three parts instead of two. This figure also demonstrates an arrangement that is frequently adopted. On each of the side frontages there is a



[illegible]

FIG. 6.

carriage entrance, thus permitting vehicles to go in on one side of the house and come out again on the other side after taking up or depositing the visitors at the foot of the staircase at the bottom of this circular passage.

In dealing with flattened corners, as we have just described them, the constructor has not much field for the exercise of his talent, the corner front being merely a continuation of the lateral façade. We may remark, however, without entirely approving the result, the great pains taken by the architect of the third house (Fig. 6) to modify the triteness of its façade. Some better method might surely have been found for joining the two sides than to leave the corner face plain after having adopted those voluminous columns reaching to a height of two floors. Besides, what function is performed by these columns, which rest on consoles and sustain a cornice that is totally useless, as it caps nothing, and is, moreover, surmounted by two floors. Yet, remove this useless cornice and the columns no longer have any raison d'être, or the consoles either. It is, in fact, pure ornamentation, and as such, we find it rather encumbering.

Though the architecture of these houses is somewhat commonplace, it has the merit of being for the most part simple and unpretentious, a quality not invariably met with in the edifices forming the third of the three categories spoken of above, that is to say, those whose corner is rounded off and presents a circular shape. This course is not usually followed unless the house is located on a square sufficiently large, or on an avenue sufficiently wide, to allow of the recoil; it is, in reality, not a simple rounding off or softening of the angle, but a veritable tower is placed at the intersection of the two streets. This is not an innovation, as, apart from the circular pavilions, which in past times flanked the angles of châteaux in memory of the ancient towers of defense, urban edifices were also built in this form, as is evidenced by the Pavilion de Hanovre, built in Paris about the year 1750 on what is now called the Boulevard des Italiens. But it is especially during the last thirty years that apartment-houses have been built after this fashion; and we must believe that the tower has a great fascination for landlords, seeing that every house of any consequence possesses this appendage, which in most instances is a mere decoration and is sometimes quite inappropriate. Fashion has also had something to do with it; in our era of wealth the rich man wants to have his tower, just as in former days every powerful noble had his dungeon. The tower is precisely the dungeon of the bourgeois, who wishes to assert by some external sign the might of his shekels and the solidity of his credit. We are bound, in fact, to recognize that although this tower arrangement has certain advantages it is principally adopted for the sake of show, and that, here again, inside comfort is sacrificed to external appearance. It is the passers-by who reap the enjoyment, and it cannot be denied that the lantern or dome-shaped summits standing out here and there from the straight line of roofs do vary the monotony of our avenues. The tenants also are flattered, by the same sentiment as the landlord,at the idea of living in a house which attracts notice and gives people a good opinion of them. Consequently, they submit meekly enough to the inconveniences connected with the internal arrangement of their flats. The drawing-room could not well occupy any other position than this place of honor; but, if as we have said, it is a difficult matter to furnish a room containing numerous windows, the arrangement of the furniture in a room of circular shape is still more embarrassing; besides which, it is pretty certain that, in whatever position one sits there will be a window at one's back, and, while everybody is not incommoded by this, we think it detracts to some extent from the comfort of the room and gives one the impression of living in the street.

Paris contains a hundred houses in

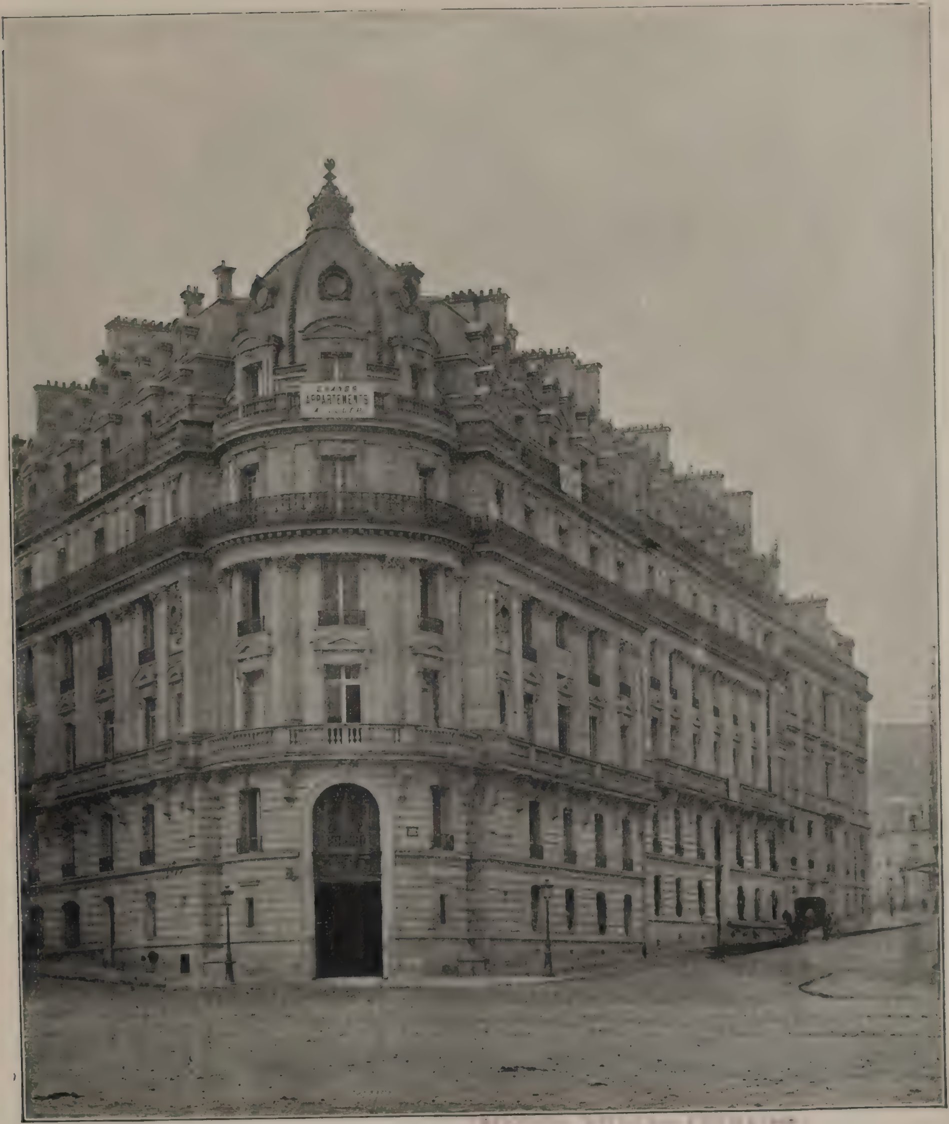


FIG. 7.—APARTMENT HOUSE, RUE BOISSIERE AND RUE DE LONGCHAMPS.

the same style as the building shown in Fig. 7, which is located at the crossing point of the Rue Boissiere and the Rue de Longchamps, with its principal view toward the Place d'Iena. You will see everywhere the same mode of decoration, consisting in placing imbedded columns on the balcony of the second floor, their capitals supporting the cornice on which rests the fourth floor balcony. Here again we may ask ourselves whether the columns and cornice serve any useful purpose. It is an open question; the former justify the latter without having in themselves or in the necessities of the construction their own proper justification. However, we can understand the architect's desire to enrich the outline of this tower, which, if left bare, would have resembled a cylinder covered by an extinguisher. Still, we hope that one day something better will be found.

The constructor of the house repre-

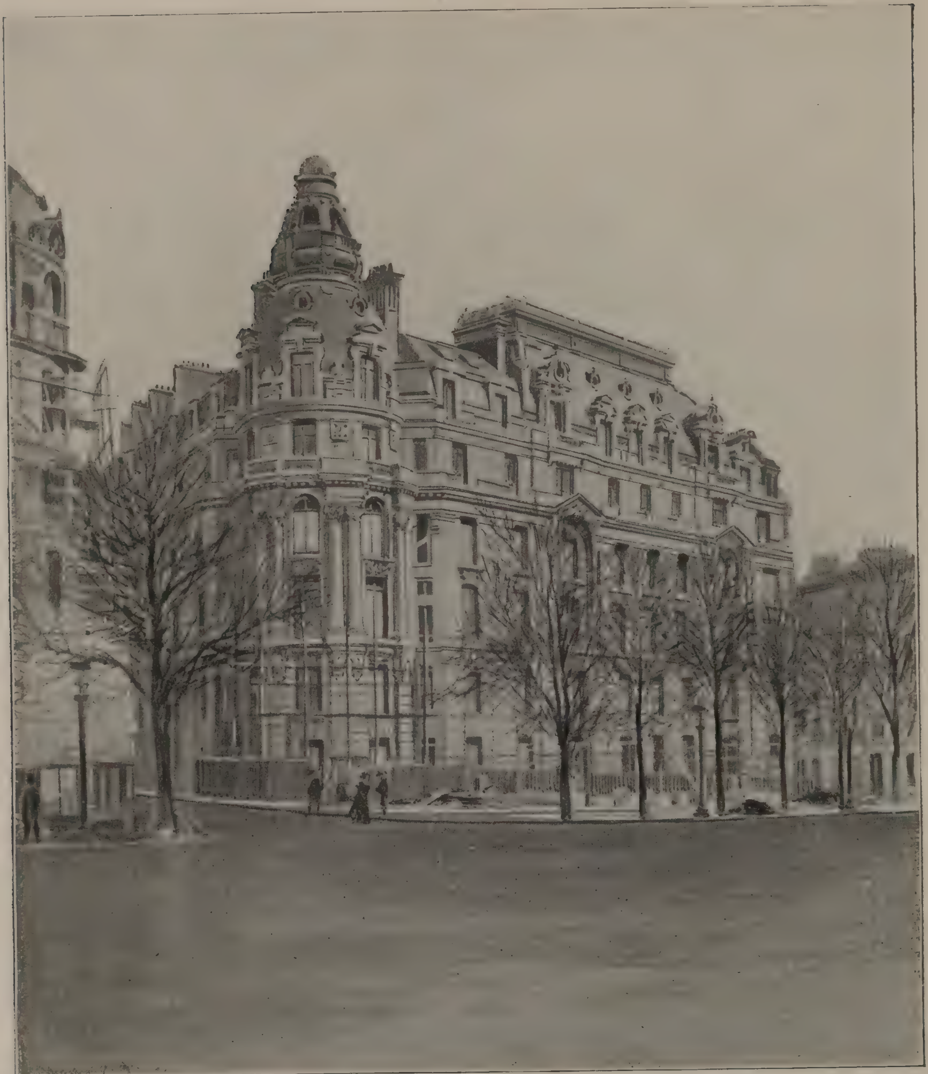


FIG. 8.—APARTMENT HOUSE, RUE WASHINGTON AND AVENUE DES CHAMPS ELYSEES, PARIS.

sented in Fig. 8, located on the corner of the Rue Washington and the Avenue des Champs-Elysées, and to which the finishing touches are now being put, does not seem to have done any better. Instead of one column he has put two. Perhaps this was necessary in order to satisfy the eye and to have the appearance of supporting the peculiar crown with which he has capped his cylinder. A cupola was not enough for him, so he has added thereto a belvedere surmounted by a rather unexpected end-ornament. We cannot imagine the purpose of the belvedere, or who, in an apartment-house, can enjoy the use of it. Will it be the domestics, who are the usual denizens of these upper regions? On the whole, we incline rather to the theory that this terrace is intended by an obliging attention on the part of the landlord, to enable the tenants to look over their neighbors' heads and see the fireworks which illuminate the four corners of Paris on the Fourteenth of July. An-

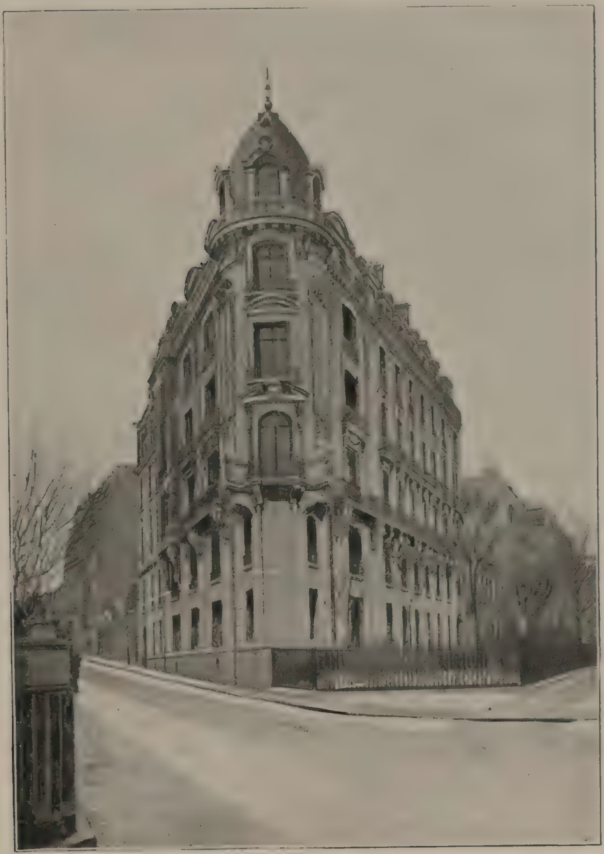


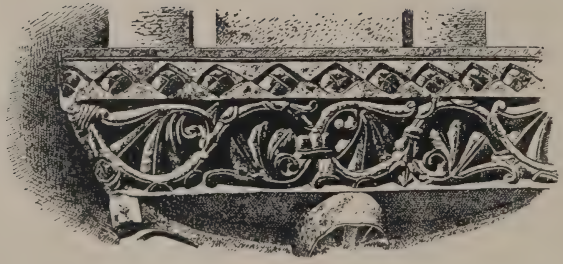
FIG. 9.—APARTMENT HOUSE, AVENUE HENRI MARTIN, PARIS.

other and more probable explanation of this exuberance lies perhaps in the landlord's desire to have something strictly novel and to build a house higher than the neighboring ones, for it will be noticed that the illustration shows another house which likewise has the inevitable corner tower.

One more, and a last example, located on the Avenue Henri Martin, in the Trocadero district, displays greater ingenuity and sounder taste, and furnishes us furthermore with a specimen belonging to the last of the three kinds of corners above named, that of the acute angle. Sharp enough, in truth, was the tongue of ground which the architect had to utilize, and narrow enough the space for placing a principal room on the corner, yet the position was too good to be wasted by putting a minor chamber there. The difficulty has been solved in a very ingenious and yet simple fashion. From the second floor upwards the architect has dilated the walls and supported them by corbelling. He could not commence at the first floor because the regulations forbid balconies or projections of any sort below the second floor. This interdiction, it appears, is a relic of the Middle Ages and was enacted because, with the narrow streets of those days, any corbelling at a lower height would have obstructed the passage of vehicles, especially wagons with high loads of hay. It is evident that in the present case, particularly as there is a garden in front of the house, the corbelling would not have obstructed anything or anybody; but unfortunately argument has never yet prevailed against a regulation. The increased width thus given to the three upper stories has made it possible to place a window in the front part of the tower, thus making up in a measure for the insufficiency of the ground. It will be noticed also that the edifice has been rendered more graceful by the obligation of keeping the basement solid, which affords another proof of the adage that "necessity is the mother of invention" and is often a surer guide than complete liberty.

The few examples cited are, as we have said, for the most part of recent construction; they will, therefore, give a fair idea of what is being done in Paris in this direction. We do not assert that we are entirely pleased with them, or indeed with the majority of other contemporary erections, in which we meet again and again the whole arsenal of musty formulas, the eternal stock of antiquated elements that have served hundreds and hundreds of times and yet without which it would seem that architects could not exist. We Frenchmen still retain our partiality for stone; we wish our buildings to last forever and we believe that outside of this material there is no salvation. Iron has not yet established its reputation and can produce no title-deeds to prove its high antiquity; it is a newcomer, an upstart, and as such is still regarded with suspicion. And yet iron seems to be the material that is destined to infuse into modern architecture the new blood of which it stands in such great need.

P. Frantz Marcou.



THE CLOISTER; CAVAILLON CATHEDRAL.

BOSTON PUBLIC LIBI

FRENCH CATHEDRALS.

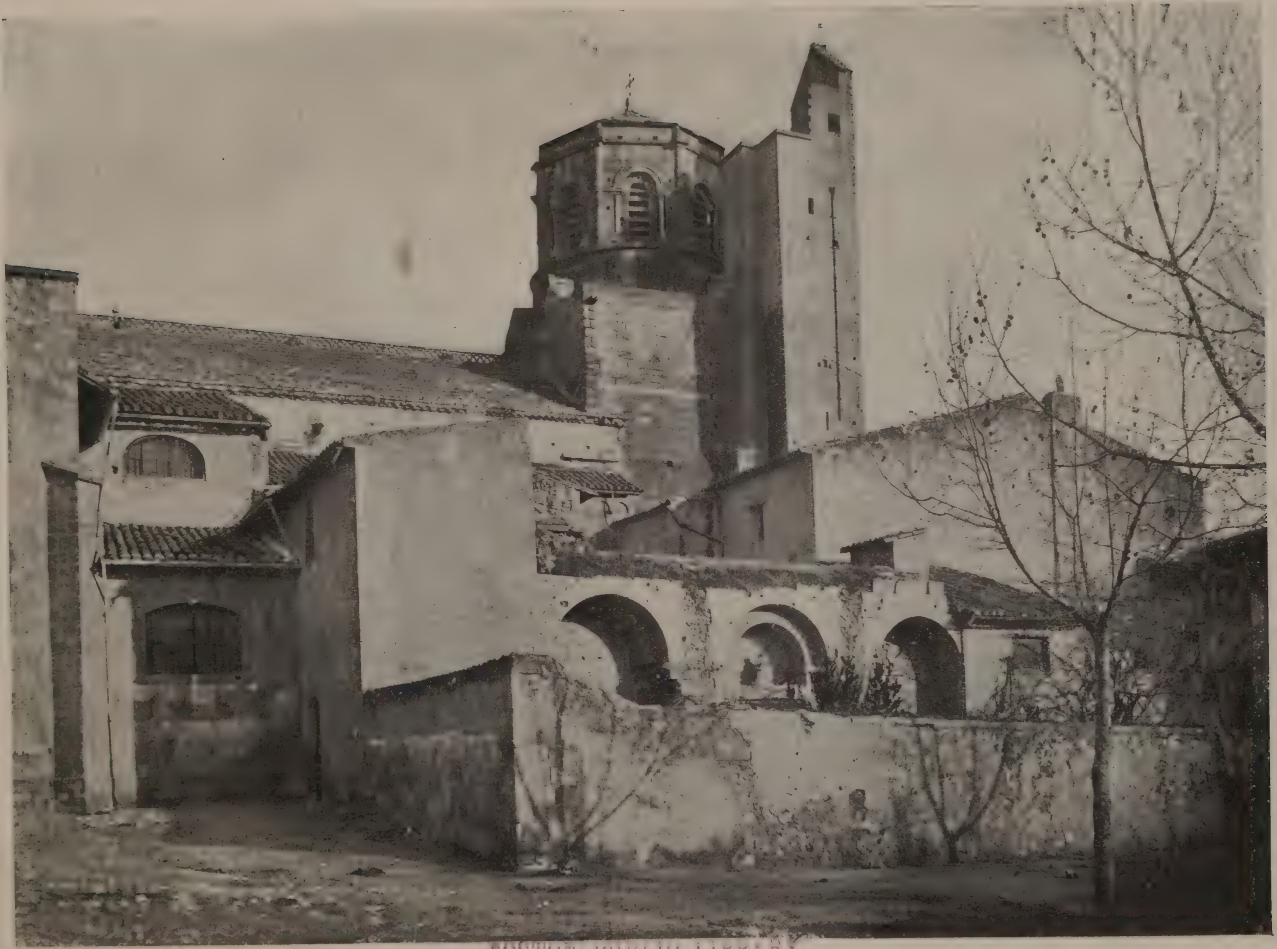
Part IX.

THE CATHEDRALS OF PROVENCE. V.

I.

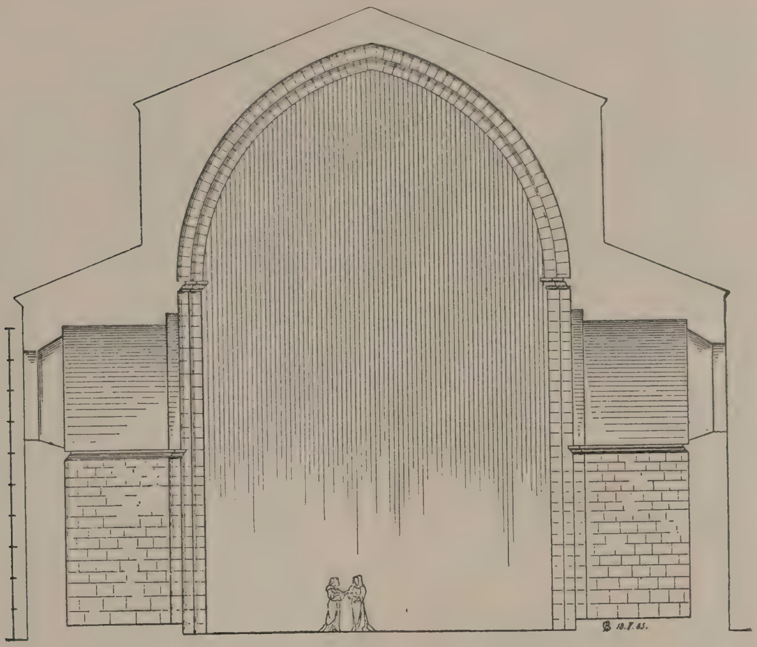
THE cathedral of Orange, though of little architectural importance, offers one of the simplest plans in Provence, and is one of the best types of the hall basilica in France. It is a rectangle with a pointed tunnel vault carried on plain double arches, which divide it into four large bays. They rest on plain pilasters applied to the inner faces of large piers which are internal buttresses, forming deep recesses connected with round arches with inner broader arches behind them. These recesses are now used as chapels, but their shallow form is not suited to that purpose. There is a striking similarity between this plan and that of the cathedral of Fréjus, though the latter has cross vaults.

An entrance on the south side opens into the second bay. The chapels are lighted by small round-arched windows in the upper part of the walls, and on the south side small windows have been cut into the vaulting in the second, third and fourth bays. The choir, somewhat narrower than the nave, and entered by a series of plain recessed pointed arches, of which the lower rest on barbarous corbels, fills the lower part of the tower. It is covered by a dome with an octagonal base and the usual pendentives. Beyond is a small semicircular apse—pentagonal externally—now walled up and not forming part of the cathedral interior. Externally the cathedral is closely surrounded, in large part, by unimportant buildings. The south porch retains



BOSTON PUBLIC LIBRARY.

THE CATHEDRAL OF CAVAILLON, FROM THE SOUTH.

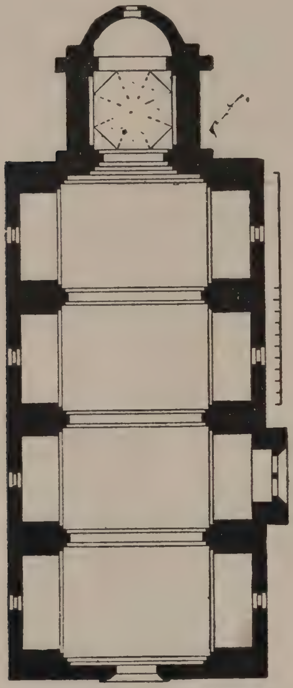


TRANSVERSE SECTION, ORANGE CATHEDRAL.

some fragments of the twelfth century in its lower parts, while its very irregular upper portions, entirely without beauty, date from the fourteenth. The tower, built in 1338, ruined by the Protestants, and subsequently restored in part, is not wanting in mass, but in its present almost dismantled state it is of little interest.

The cathedral of Orange was built in 1085 and a consecration is recorded in 1208. It suffered so severely from Protestant injuries, the tower and vaulting being destroyed, that though the latter was rebuilt in the sixteenth century in its original form, the building, as we now have it, is scarce more than a copy of the original. Yet it is a fair type of a Provencal church of the eleventh century, though its chief interest at present is in its plan and construction. Its interior is covered with tawdry and unimportant painted decorations which cover up the stonework without giving it beauty. The small size of the church, and the simplicity of its structure, with the absence of carved ornament, form a whole in which even the archaeologist will find little to interest him. The western door dates from the present century. The south portal, though in a very bad state, is the most pretentious external feature. The doorway is of a debased Renaissance type, with three Tuscan columns carrying a pediment. The porch is enclosed within three irregularly centred pointed arches, resting on a series of small pedestals carrying a continuous cornice, which serves as their capitals.

Fortunately the visitor to Orange will find so much to interest him in its superb Roman remains, that a visit to the city will not be regretted because of the poverty of its cathedral. Yet it is a striking fact that the builders of this cathedral made no use of the abundant and suggestive materials at their very doors. The city of Avignon offers almost nothing in Roman remains, yet the detail of its cathedral is distinctively of this class, the cornice which supports the ancient parts of the tower being in fact a reproduction of the cornice of the attic of the triumphal arch at Orange. Obviously, at the time when the cathedral of Orange was built the predilection of Provencal builders for Roman motifs had passed away. Certainly it is difficult to find other grounds for its ignoring, unless, indeed, it was destroyed when it was rebuilt, for in the sixteenth century the meaning and purpose of the true art of Provence had long been forgotten.

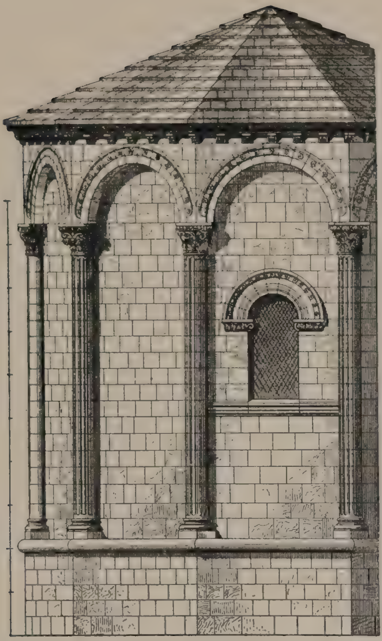

PLAN OF ORANGE CATHEDRAL.

II.

Few facts have survived in the history of the cathedral of Cavaillon; it was dedicated in 1023 and again in 1232, and considerable additions to it were made in the seventeenth century. But no record tells us what was done in the early period of its history, and even the fact of a destruction by fire immediately after the dedication of 1023 is not known to have actually occurred. In plan it is exactly that of its near neighbor, the cathedral of Orange, though its cloister and later additions materially modify it. It differs considerably in dimensions and arrangement, the nave being narrower, and of five bays, each smaller than at Orange, while the internal buttresses are thicker. The choir, which has a dome, is the same width as the nave, and is inclosed by a polygonal apse. The pointed tunnel vault of the nave rests on double arches, as at Orange, but the outer piers, applied to the buttresses, have small upper columns as at Aix and Arles; the central piers have been cut away below these columns and are supported on corbels, below which are large sculptured groups. A round archway forms the entrance to the choir, whose dome is of the usual type, with pendentives—rather large—with the symbols of the Evangelists, and a rib in the centre of each face. The semidome of the apse is an ugly recent restoration, with a skylight cut in its top. The whole of the interior is painted or gilded in the worst possible taste, with the additional disadvantage of covering up much of the primitive construction. At the western end of the nave is an inner porch or tribune supported by Ionic columns, built in the seventeenth century.

The chapels between the buttresses, which entirely modify the character of the interior, are of great variety. On the north side, beginning at the west, is the chapel of Véran (fourteenth century), whose Gothic structure is almost hidden by a sumptuous gilt decoration in the Renaissance style. Then comes a plain one, with a round tunnel vault at right angles to the nave. The third vies with the first in the elaborateness of its decoration, and perhaps surpasses it with its coffered vault. The fourth and fifth chapels on both sides of the nave are plain, with tunnel vaults. The fourth on the south side has, however, been recently decorated with an attempted "restoration."

The first three chapels on the south side have outer bays of the seventeenth century, in a severe style of architecture, with domical ceilings and plain pilasters. The first is two bays deep, the second is three, and the third forms an entrance from the cloister to the cathedral, by which the church is



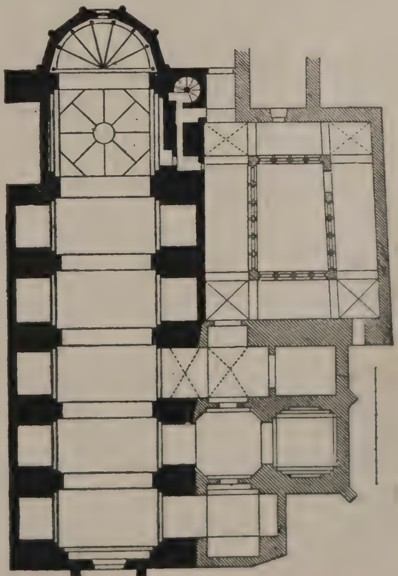
CAVAILLON. RESTORATION OF APSE BY REVOIL.

usually entered. A third bay to this passage is a small chamber with a flat ceiling used as a baptistery.

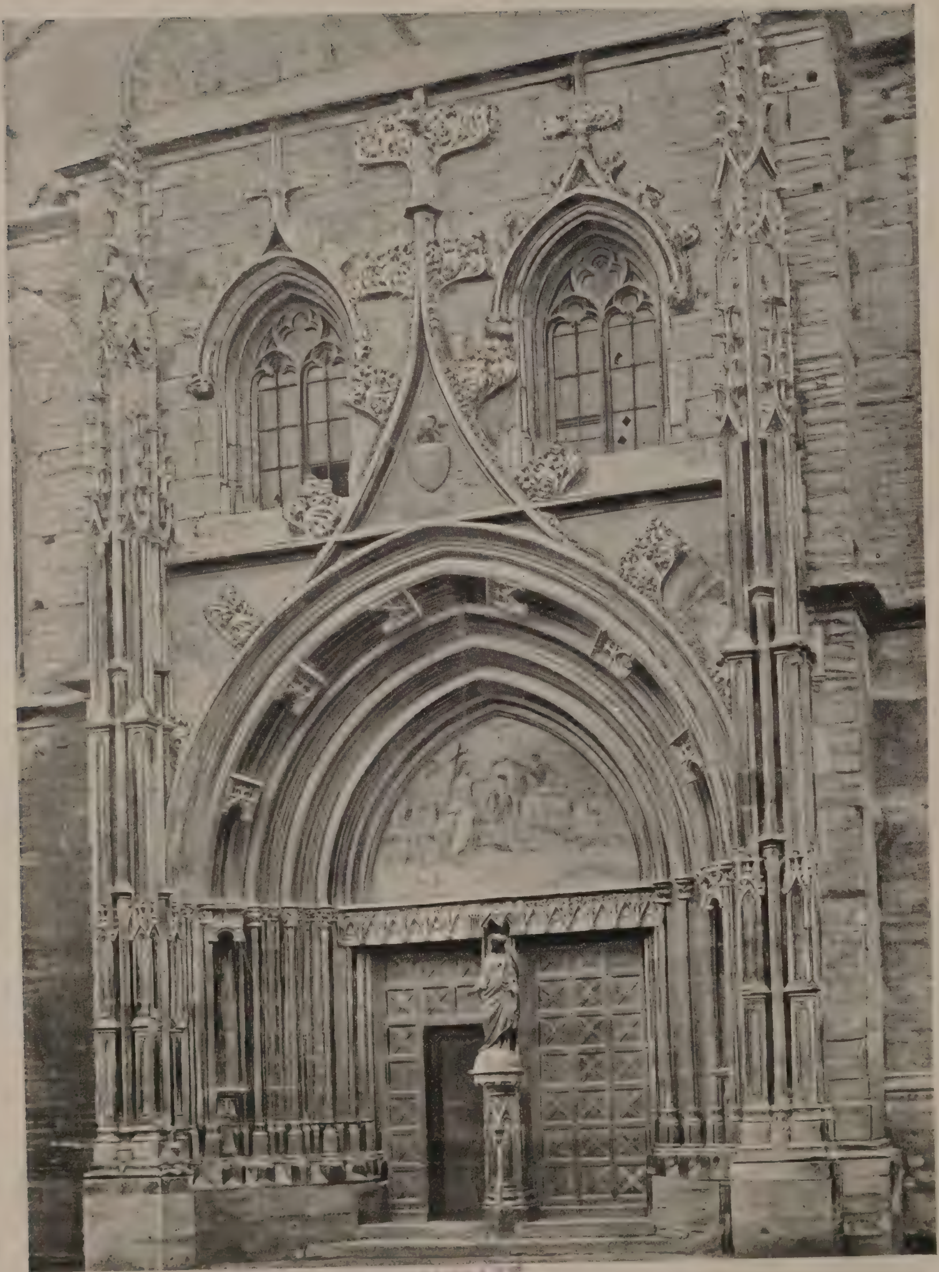
Like the cathedral of Orange the cathedral of Cavaillon is better studied in its plan than in the structure itself, but unlike that cathedral it possesses external features of the greatest interest, though now much injured by time. Its outer apse wall, its central tower, the friezes on the walls of the nave, and the cloister are each worthy some extended study. In some respects the apse is the most interesting. Externally it has five sides, though it has seven within. A channelled column, save next the cathedral where it is plain, stands on a ledge at each angle. The capitals are of acanthus leaves or acanthus and grotesques. Round arches with an upper moulding or hood, connect the columns, the central one being decorated with small rosettes. In the middle of the central bay is a small round-headed window, now closed. The wall is crowned with a small foliated cornice on consols carved with leaves or heads.

There is some classic feeling in this decoration; it recalls, in its general effect, the west porch of the cathedral of Avignon, the partly dismantled west entrance of the cathedral of S. Paul Trois Châteaux, and the west doorway of the south aisle of the cathedral of Aix. But the date is obviously later than any of these. The channelled shafts of the columns might be appropriately surmounted with Corinthian capitals, but though the acanthus leaf is present in the capitals they are not classic, and the introduction of grotesque shows a wide departure from the earlier usage. M. Révoil inclines to the belief that this decoration may date from a time not much before the second recorded dedication of the cathedral by Pope Innocent IV. in 1232, but the style of the carving is considerably earlier than that of the octagonal tower, which he dates at the end of the twelfth century, but which, of the two parts, is more probably the less ancient.

The lantern surmounts the dome of the choir. A low plain circular base finished with a roll moulding, stands on a large square rising above the roof. Above is the octagon, with columns on each edge, the abaci of whose capitals forms a line around it. A low recessed wall above supports a flat

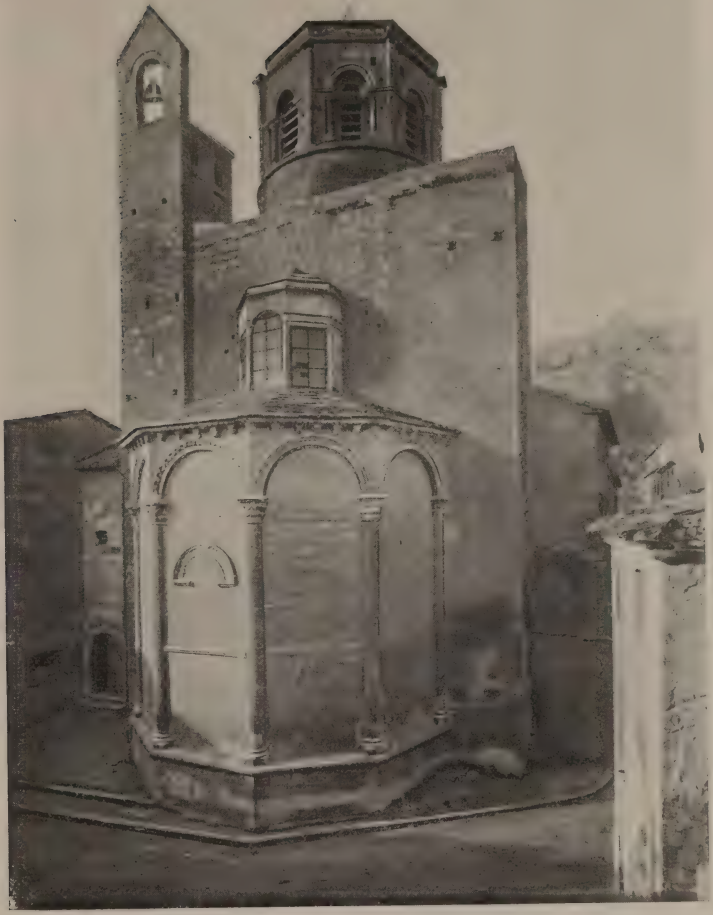


PLAN OF CAVAILLON CATHEDRAL.



BOSTON PUBLIC LIBRARY.

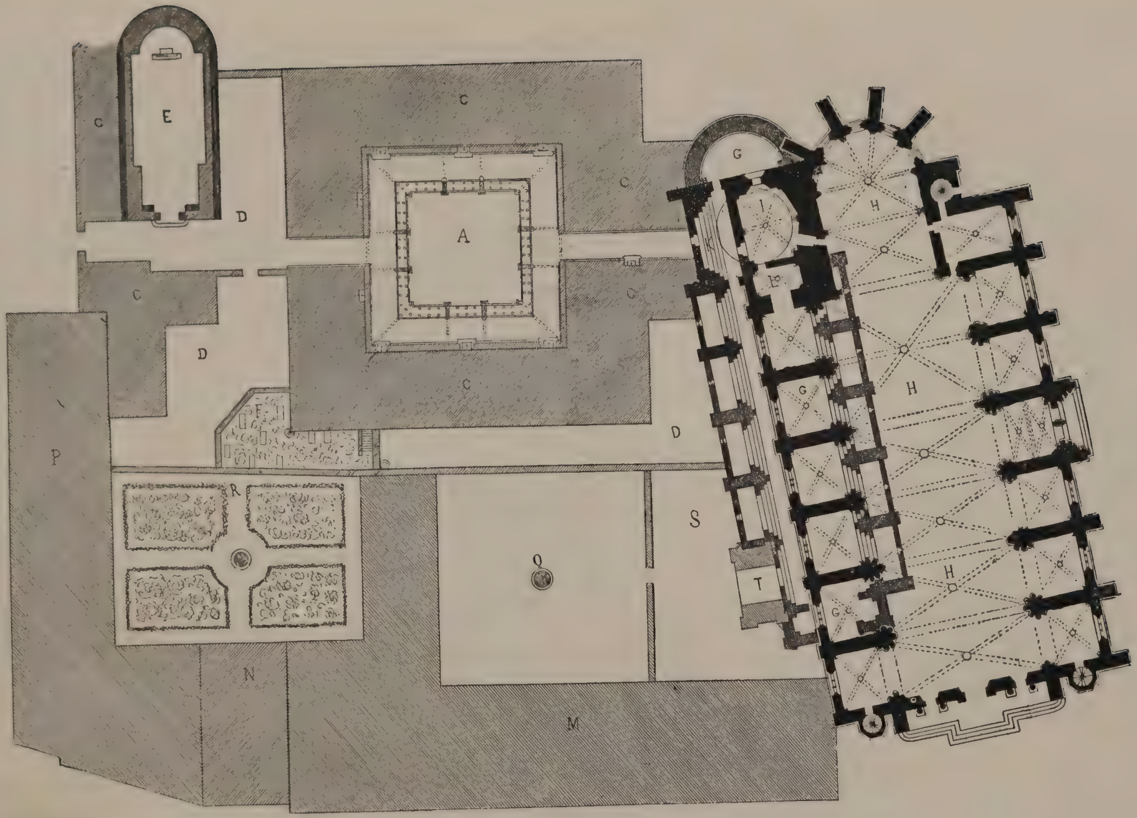
SOUTH PORTAL, CARPENTRAS CATHEDRAL.



EAST END, CATHEDRAL OF CAVAILLON.

pointed roof. Each face has a small round-headed window enclosed in columns carrying an arch, the abaci here being also carried around the octagon as a string, passing around the corner columns. It is an exceedingly interesting structure, though suffering somewhat from its unfavorable position and comparatively low height. The east wall of the cathedral, to which the apse is applied, ends abruptly in a horizontal line, and nothing therefore leads up to the lantern. But seen from the cloister, or from the open square beyond the cloister, it is completely visible. Here, also, may be seen the singular narrow bell turret that immediately adjoins the apse, standing between it and the unimportant door that leads to the cloister. It is surmounted by a gabled arch for a bell; much of its inner or western part has been rebuilt.

The exterior walls of the cathedral are largely rough plastered. In the uninteresting mass of applied buildings on the south it is still possible to distinguish the upper parts of the thick nave buttresses, with two small applied arches, like the fragments of a blind arcade, on their upper surfaces. The buttresses are stopped below the roof, and a connecting wall built between them, which, with them, is cov-



PLAN OF CATHEDRAL, CLOISTER AND EPISCOPAL PALACE, CARPENTRAS.

A, Cloister (now demolished); C, dwellings; D, court; E, chapel of S. Etienne; F, cemetery of the cathedral chapter; G, old cathedral of S. Pierre; H, cathedral of S. Siffrein; I, sacristy; K, inner sacristy (both under ancient tower); L, treasury; M, episcopal palace; N, part of the palace, now demolished; P, library of the bishop; Q, court of honor; R, garden of the palace; S, court of offices; T, Roman arch.

ered with a tiled roof. At the top of the nave wall, on the south side, is a rich frieze of wreath-like foliage, now much decayed. The nave is roofed with stone with strongly marked longitudinal lines on the south side, and with tiles on the north; along its ridge is the original stone crest of interlaced half-circles.

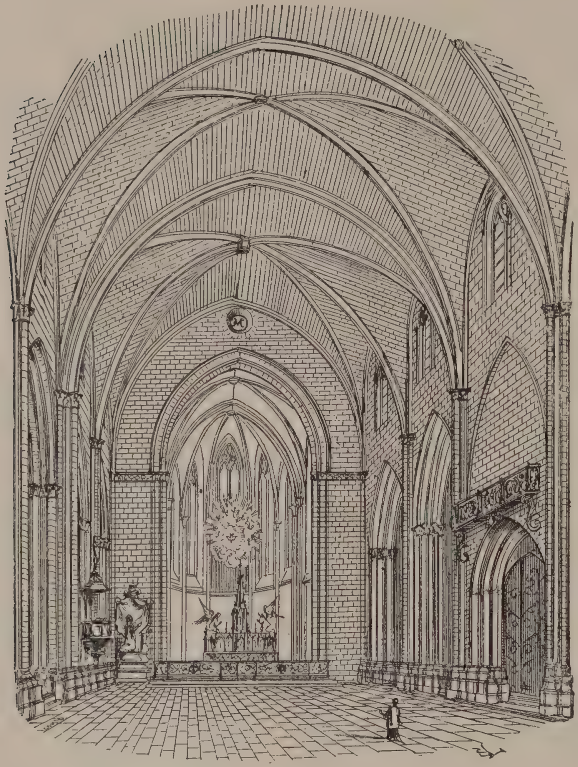
On the north side of the cathedral more of the stone construction is visible, though there are no buttresses, and the chapels are scarcely more interesting than the featureless structures on the south. But the frieze is richer and more elaborate than on the other side of the church. It is much defaced, but the subjects show a succession of men, emblems, animals and ornamental objects whose sacred significance must at one time have been well known, but whose meaning has long since been lost. This cornice is not visible from the street, but an obliging iron-worker will take you to his room at the top of the opposite house, and charge nothing for the courtesy he extends to you!

The cloister is on the south side of the cathedral, and is evidently of the eleventh or early part of the twelfth century. It has none of the light and graceful character which distinguishes the cloisters of Aix and Arles, but somewhat suggests the cloister of Vaison in the heaviness of its forms and the lowness of its proportions. It is a small rectangle enclosed within plain solid walls, of which the northern is the south wall of the cathedral, and the western the wall of the third or entrance chapel. It has four bays on the east and west, six on the north and five on the south. The two long sides, however, are approximately of the same length, an arch of extra width being inserted on the south as an entrance to the quadrangle. The arcade is formed of a double series of round arches, of which the outer rest on broad piers, to which are applied the short columns carrying the inner arches. The arches are plain, with a small hood moulding on both inner and outer faces, save in the east gallery where it is omitted. The carving of the capitals is so greatly defaced as to be scarcely intelligible, but a few pictorial ones can be distinguished, as well as some of the Corinthian type. The walks have round tunnel vaults, with a single arch in the centre and at each end, where they enclose cross vaults, those on the west side having ribs and those on the east none. The vault arches and the diagonal ribs at the angles rest on rounded corbels much defaced. The west gallery is slightly narrower than the others, and its inner arches have semi-octagonal piers with string-like capitals, instead of the applied columns of the other walks. The buildings which enclose the cloister on the east and west are entirely featureless; the exterior of the south wall has three deep round arches. The cloister is not restored, save for some slight patchings in the vaults, but its generally decayed condition is not untypical of the state of this cathedral.

III.

The cathedral of S. Siffrein, at Carpentras, is a Gothic structure of the fifteenth century, but connected with it, and partly covering its sacristy, are some remains of the cathedral of S. Pierre which immediately preceded it. All that is left is the dome of the choir and a fragment of the nave, which evidently formed part of a church of the early part of the twelfth century. It has been dated as late as the thirteenth century, but neither the structure nor the detail that remain warrant so late a time.

Sufficient data has survived to permit a reconstruction of the plan. It had an introductory or vestibule bay at the west end, a nave of five bays, with a pointed tunnel vault, and bordered with chapels between the heavy buttresses, a choir with an octagonal dome, and a semicircular apse; a plan with very striking resemblance to the cathedrals of Cavaillon and Avignon. Nor are the points of resemblance in the plan alone. The fragment of the



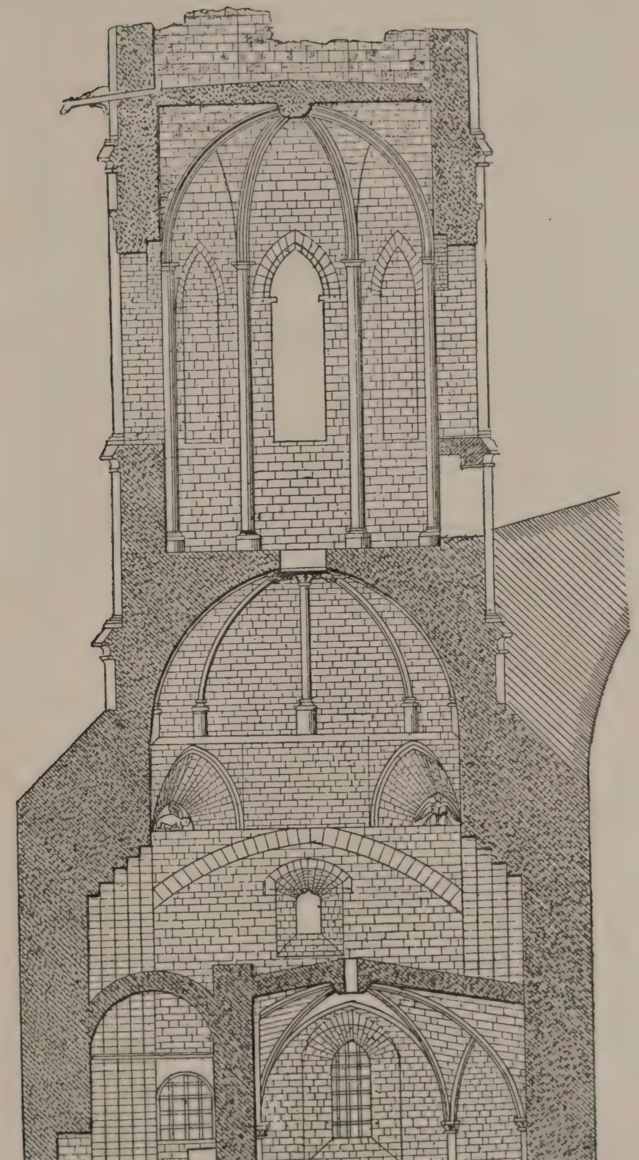
INTERIOR OF S. SIFFREIN, CARPENTRAS.

nave shows the inserted column in the upper part of the piers, and above is a broad carved frieze or cornice, as at Avignon. Only one of the decorated columns remains, and its capital is a heavy piece of sculpture not even fitted in size to its column.

The dome bay, with the tower above it, remains intact, standing free over the sacristy of the present cathedral. It is supported on the north and south sides by a series or recessed arches, very much as the domes of the cathedrals of Avignon and of La Major at Marseilles. But here the arches rest on piers rising from the ground, while in the other churches they are applied to the east and west arches of the enclosing bay. Pendentives of the usual type, with the symbols of the Evangelists, form a slightly irregular octagon, around which runs a carved string variously ornamented with human masks of barbarous character in the corners. The dome has column-like ribs in the centre of each face, meeting at the summit in an open ring.

The belfry or tower which rises above the dome is much later in date than those of Avignon or Cavaillon, and may be as recent as the early part of the thirteenth century. Instead of the low towers which surmount the domes of those cathedrals, there is a lofty chamber, with applied columns in the angles, whose bases and capitals are Romanesque, but which carry Gothic vault-ribs and a slightly pointed vault. Above are the fragmentary remains of the windows of an upper stage, but the original finish of the tower has long since been lost.

This fragment is a most interesting monument of the transition period in which the characteristics of several epochs may be distinguished. It is certainly to be regretted that the disasters which befell the city of Carpentras in the thirteenth and fourteenth centuries, and especially its burning in



BOSTON PUBLIC LIBRARY.

SECTION OF THE TOWER OF S. PIERRE, CARPENTRAS.

1312, should have caused the decay of this church and necessitated the building of a new one. Notwithstanding that a part of this later structure was built under what remained of the older, it is probably to their close juxtaposition that we owe the survival of the older fragment. The final collapse of the cathedral of S. Pierre appears, however, to have been a matter of some time. A writer as late as 1649 speaks of four of the chapels of the nave as still existing, and it is well known that the remains of the cloister that once formed a part of the cathedral group were removed in 1829, to make room for some prisons.

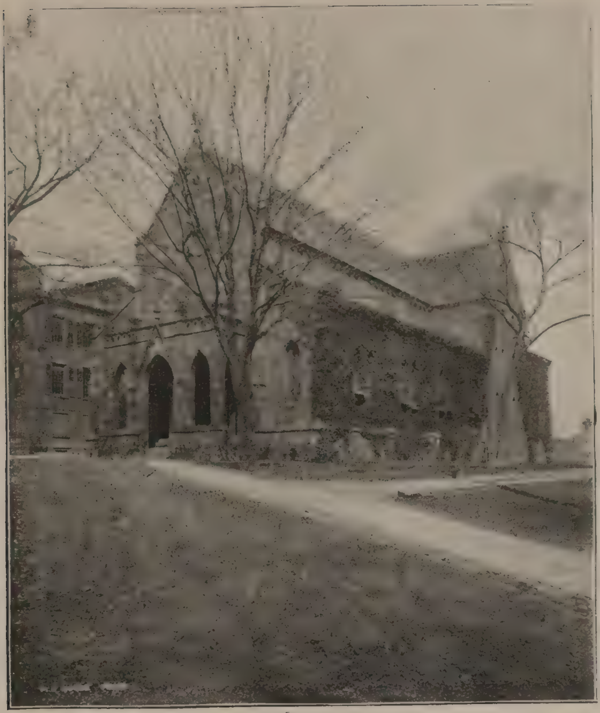
The present cathedral of Carpentras, the cathedral church of S.Siffrein,with which the fragment of the ancient church is connected, offers little of interest to the traveler, the archaeologist or the architect. It was begun by Pope Benedict XIII., while resident at Avignon, who regarded Carpentras with especial favor, retaining to himself, in 1403, the title and function of the bishop of Carpentras. The first stone of the present edifice was laid in 1404 by his representative and delegate, Artaud, archbishop of Arles, the architect, as an inscription tells us, being one Colinus Thomacii.

The work of building progressed slowly. These were troublous times for the region, money was collected slowly and for many years the people were quite incapable of continuing the erection of even the modest building that is still the most conspicuous structure in the city. It was dedicated more than a hundred years after it had been begun in 1519.

The architectural interest of this building is comparatively unimportant. It consists of a nave of six bays, from which open chapels, and a small choir and apse. The detail is thin and slight, characteristic, indeed, of the Gothic of Provence. The church need not, therefore, detain us further than to remark that the interior decorations, especially those of the high altar and the east end are in very bad taste, and produce a result that, in this meagre interior, is almost disheartening.

The exterior, however, has in its south door one of the most charming pieces of late Gothic art in the south of France. As everywhere in this region there is a poverty in the detail that at once stamps it as an exotic type of architecture; but the designer of this portal enjoyed a great advantage in being able to set his jewel—for such it really is—in a plain wall otherwise practically devoid of architectural character. The crockets and finial of the outer arch are, indeed, quite stately in design, but the detail of the supporting columns and even the mouldings of the recessed arch are wanting in strength. On the pier that divides the doorway into two is a charming statue of the Virgin, Notre Dame des Nieges, and the tympanum is filled with a fresco representing the Coronation of the Virgin, now much defaced. The portal is really a delightful bit, but the busy traveler, intent on seeing the most within the least time, may not unwisely deem it best to omit Carpentras from his itineracy, if this be the most, as it is, that its cathedral church has to offer him.

Barr Ferree.



CHAPEL AND LIBRARY, RUTGERS COLLEGE (1873).
Henry J. Hardenbergh, Architect.

HENRY JANEWAY HARDENBERGH.

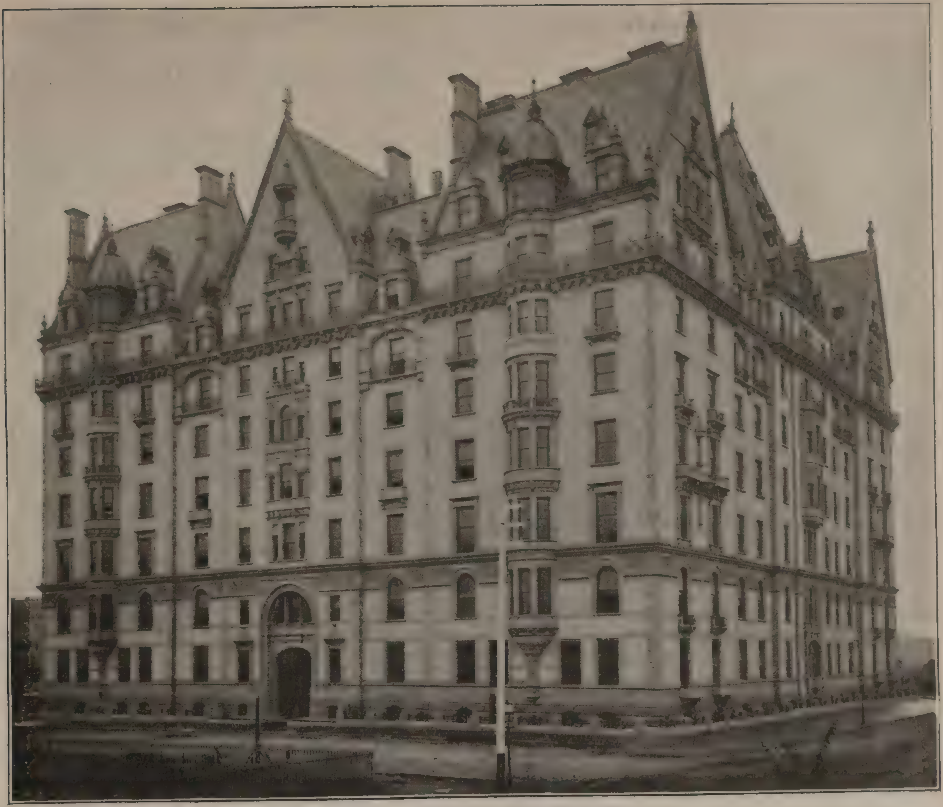
HENRY JANEWAY HARDENBERGH was born at New Brunswick, N. J., Feb. 6, 1847, although his family removed, when he was two years old, and he has since resided in Jersey City and New York City. He comes of the Dutch stock which has been so potent in the development of New Jersey. His first American ancestor emigrated from Amsterdam about 1644. His great great grandfather, Jacob Rutsen Hardenbergh, was one of the founders of Queen's, now Rutgers, College and became its first President in 1785.

In 1865 Mr. Hardenbergh entered the office of Detlef Lienau, a German by birth and temperament, and both German and French by professional training. He was a pupil of Henri Labrouste and had imbibed in that atelier a partial belief in the neo-grec of which his "patron" was the apostle. Mr. Lienau's professional work in New York was not so extensive as it deserved to be. A glass warehouse of his design in Howard street was for many years after its erection one of the most interesting and respectable of our commercial buildings, with touches of the neo-grec in detail that did it neither much good nor much harm, but with the evidence of artistic sense and training in its proportion and its fenestration, and with a straightforward and structural treatment throughout, that were very rare then and are not very common now. This work was seriously marred by the addition of a story or two, I know not whether or not by the original architect, but at any rate a necessary disturbance of a design already complete. By the same author was evidently also an office building in Cedar street, much later in date, though still before the elevator had begun to work its influence on the design of commercial buildings, and by no means so successful in composition, though it had the same attractiveness of a rational following out of the ground-plan in the elevation, and of a straightforward and structural treatment of detail. I recall nothing else of Mr. Lienau's in New York, though on the Jersey side of the North River he erected some warehouses that were very conspicuous objects in the skyline of that low shore before it was as crowded as it has since become.

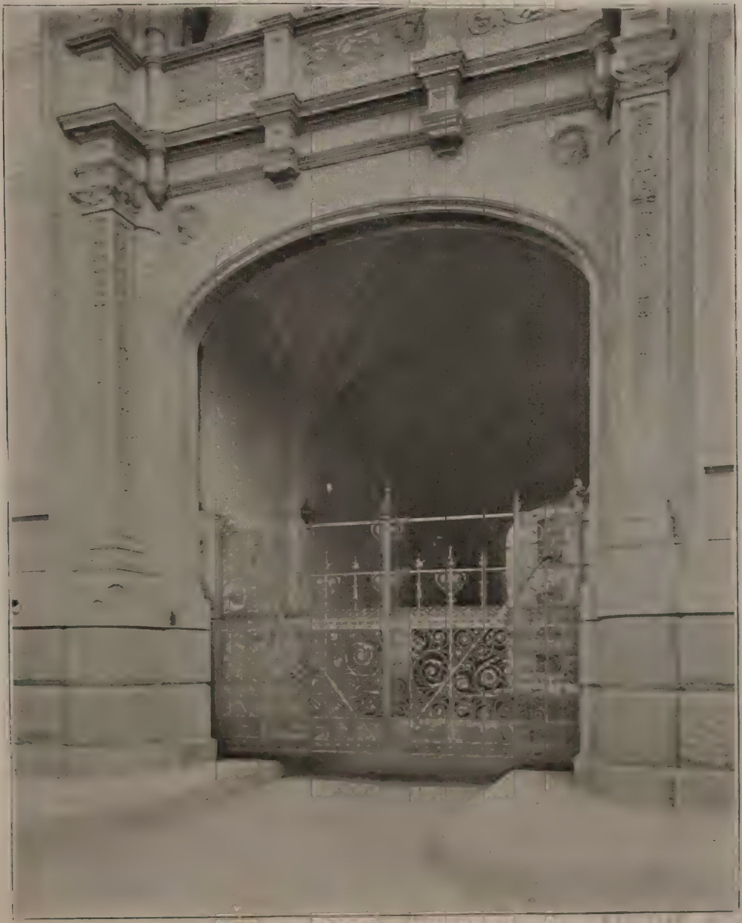
Mr. Lienau's neo-grec had no great influence on his pupil, as it has long ceased to have any influence on any designers, although the first of Mr. Hardenbergh's apartment houses, the Van Corlear on Seventh avenue, shows in some of its details the efforts of his special studies. Much more than in detail it reveals them in what I am compelled, for want of a better word, to call the spottiness of effect which seems to belong to all the neo-grec work done on this side of the water, at least. Nothing could be more remote from the quietness which the architect has cultivated and attained in his riper work than this jerky and detonating style. Mr. Lienau's own work in it was by no means so explosive as the early works in it of Mr. Hunt, who was the apostle of it in New York. But Mr. Lienau's work shows qualities that were quite independent of this special style, and that were calculated to be of great advantage to an apt pupil. Chief among them was what I have called the straightforward and structural treatment of his designs, the habit of considering the artistic problem as inextricably connected with the mechanical problem, of regarding his paper design as the drawing of a building rather than the execution of it as the building of a drawing.

When Mr. Hardenbergh was graduated from Mr. Lienau's office, "Victorian Gothic" was in full possession of the aspiring and active minded of the younger American architects. Of this, his first work, the building for the grammar school of Rutgers College (1870) was more or less an example. Three years later, however, a more important and more significant work, the combined chapel and library of the college, is Gothic, indeed, but no more of the "Victorian" variety than it is neo-grec. It is even quite as much German as English Gothic, deriving its German character chiefly from the composition and detail of one of its most attractive features, the triple porch, with its tall pointed openings without exterior mouldings, its buttresses produced through the parapet and crowned with finials, and the gable-mouldings similarly produced and crowned. It is still a creditable piece of work, which is so straightforwardly designed that it cannot conceivably become ridiculous with any change in its surroundings and that it harmonizes with the surroundings for which it was designed in spite of the want of technical congruity of its style. As the work of a young architect, almost a beginner in 1873, it is remarkable, considering what the ambitious and modish young architects of that time were doing, for its renunciation of the kind of effect and the means of effectiveness which most of them sought. It would not be just to call its sober monochrome dull, for there is no lack of animation in the composition. But it shows that the designer was less afraid of dulness than of restlessness, and it shows that he was more impressed than his contemporaries were apt to be with "the value of peace and quietness." He has continued ever since to exhibit his appreciation of those excellent qualities.

It was ten years later, after a variety of professional employments that were mainly useful to the architect, artistically speaking, as studies, that Mr. Hardenbergh began to produce a series of works which showed unmistakably that he had "found his handwriting;" that he had attained the power of putting an individual stamp upon his handiwork. This proclamation was made most powerfully, though not quite first, in



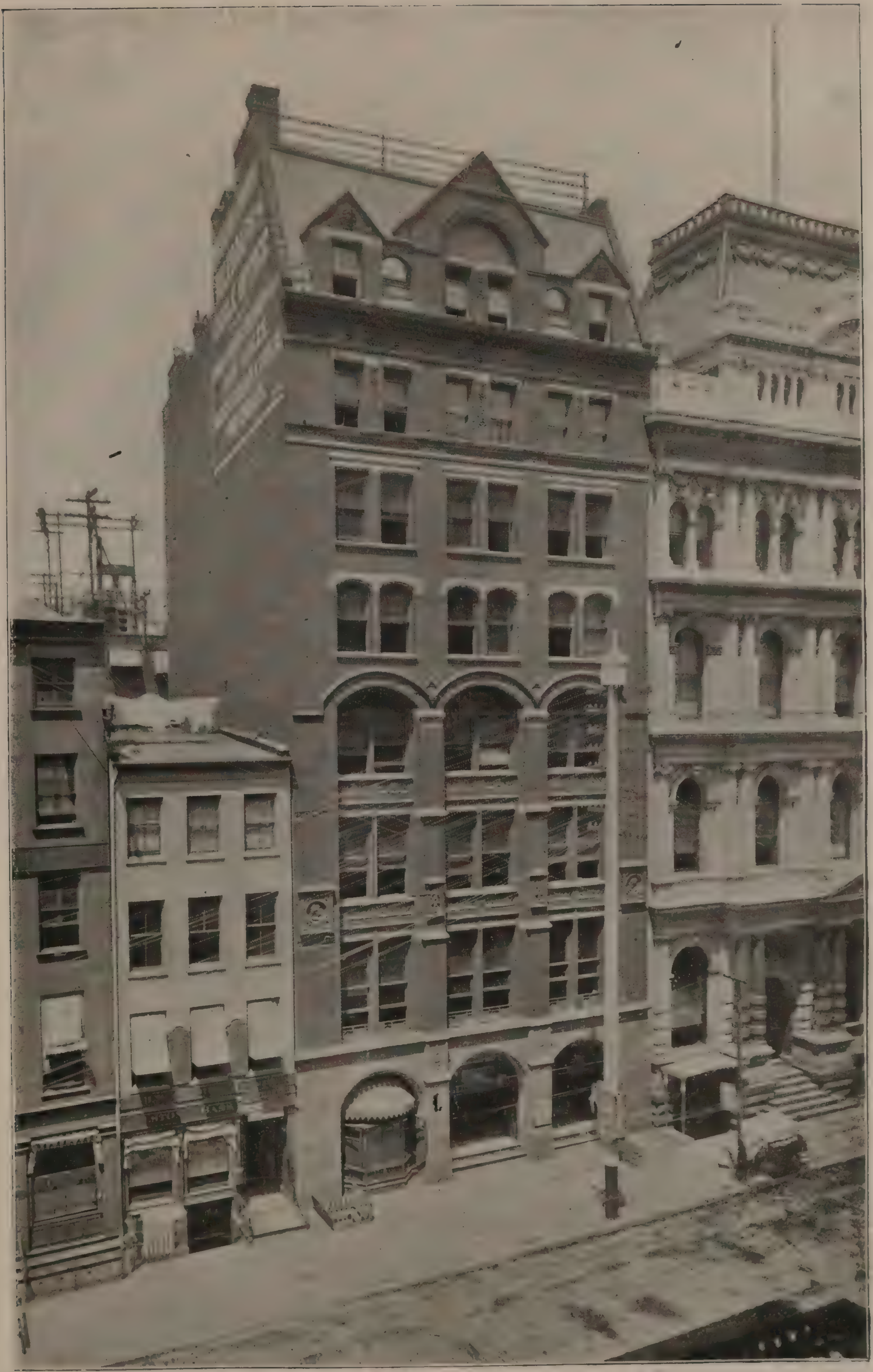
THE "DAKOTA" APARTMENT HOUSE (1884).
Central Park West and 72d St. Henry J. Hardenbergh, Architect.



AN ENTRANCE TO THE "DAKOTA."
Henry J. Hardenbergh, Architect.

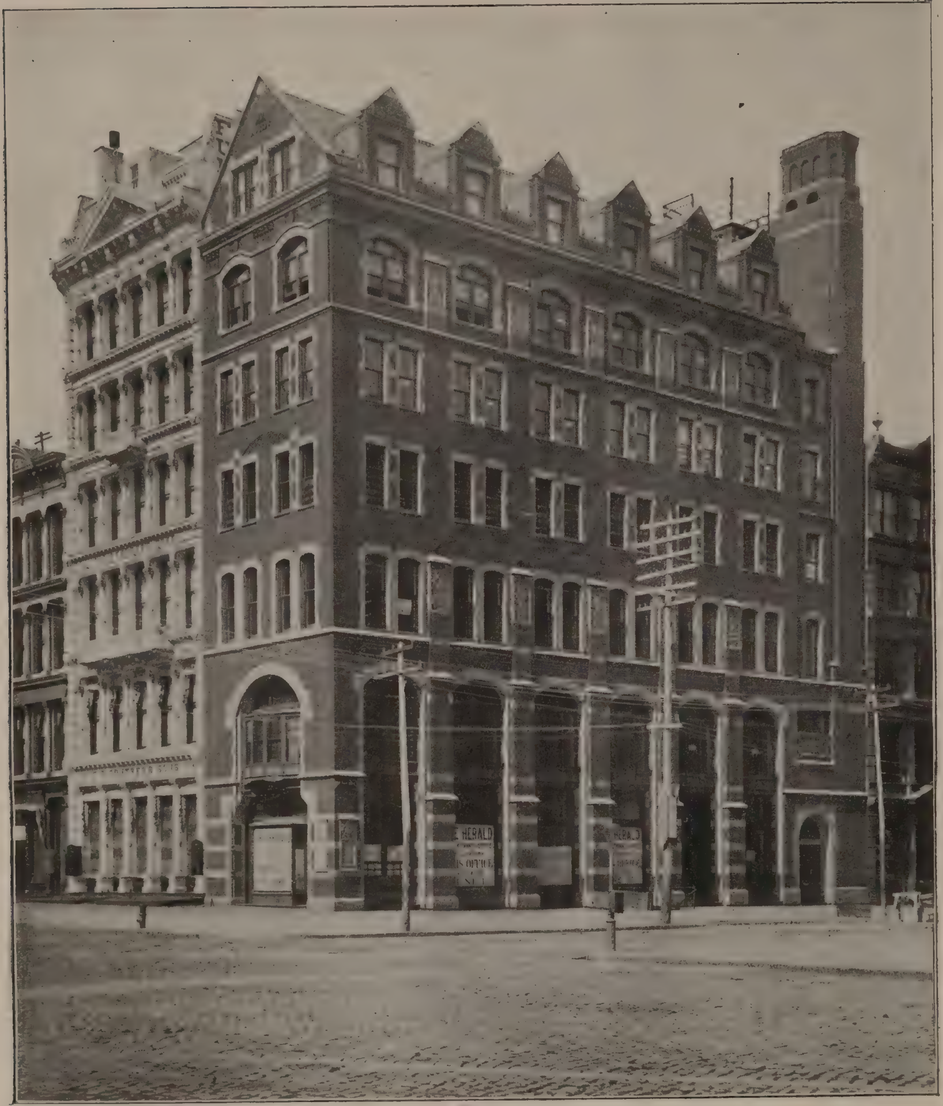
the Dakota, which is of special significance in that we may suppose that the success of it determined its author's special "line" as a builder of hotels, in which his most conspicuous work has since been done. Thirteen years ago the lofty apartment house was an architectural novelty, as the associated apartment house was a novelty in investment. The busiest designers of apartment houses were also the most successful promoters of associations. Upon the whole the architectural results of these operations were much more successful than there was any good reason to expect; much more successful, as everybody knows, than the financial results, which were so discouraging to the investors that for quite a decade nobody has ventured to go about the promotion of a new "associated dwelling." At any rate, the architectural results were so successful that it is a very considerable distinction to have designed the best apartment house in New York. The Dakota was acclaimed upon its completion of having attained that distinction, which after thirteen years it continues to hold, and which is only emphasized by the erection of newer apartment hotels in its neighborhood, with all the illumination that its design could convey to their designers. The Dakota, of course, was not an associated dwelling, but an individual investment. The architect had an unusual opportunity in a whole blockfront facing Central Park, but the opportunity involved a corresponding responsibility. Central Park is the one municipal possession of which we have a clear right to be proud, and to erect what was in 1883 a towering building of eight stories fronting it, and visible from a great part of it, was for an architect, artistically speaking, to take his life in his hand. Even if he made what in any other place would have been a success, the chances were that the judicious visitor to the Park would prefer nothing in its place, or at least an inconspicuous four-story front which he could ignore. That an eight-story apartment house could become a positive addition to the attractiveness of the Park was an attainment which the architect could scarcely have ventured to promise to himself. Yet in the Dakota this complete success has been attained. The building actually helps the Park. Its picturesqueness of outline and effect is attained without any sacrifice of unity, or even of formal symmetry, for each front is laterally, as well as vertically, a triple composition, which in both cases is carefully studied in mass and carefully carried out in detail.

It is questionable whether the vertical division might not have been still more emphasized to its advantage by constructing the whole of the two-story basement in the olive sandstone which is employed in the wrought work; but the division, emphasized by a broad belt of terra cotta at the impost of the arches and a vigorously moulded string course in stone, is quite unmistakable. Above, the arch-frieze in terra cotta that marks off the roof from the wall does not lack emphasis. The lateral division, into a central and two terminal pavilions, is almost equally effective whether the central feature is crowned with a steep hood, relieved with a crow-stepped dome and rows of spire lights, on the avenue front, or carried up into a picturesque gable on the street front. Though the projection of the pavilions is slight, they are effectually detached by the plainer treatment of the strips of curtain wall, by the separate and subordinate roofing of these, and by the omission from them of the corbelled cornice with its balcony. All the features are successfully studied, noticeably the seven-story oriels of the end pavilions on the street front. The detail is avowedly eclectic, and the general reminder the building gives of the French transitional is due much more to the picturesque composition than to the detail. One might wish for a more vigorous modelling of this detail, especially for a more forcible expression of depth in the modelling in the openings. A certain flatness pre-



WESTERN UNION TELEGRAPH COMPANY'S BUILDING (1883).

Broad St., N. Y. City. Henry J. Hardenbergh, Architect.



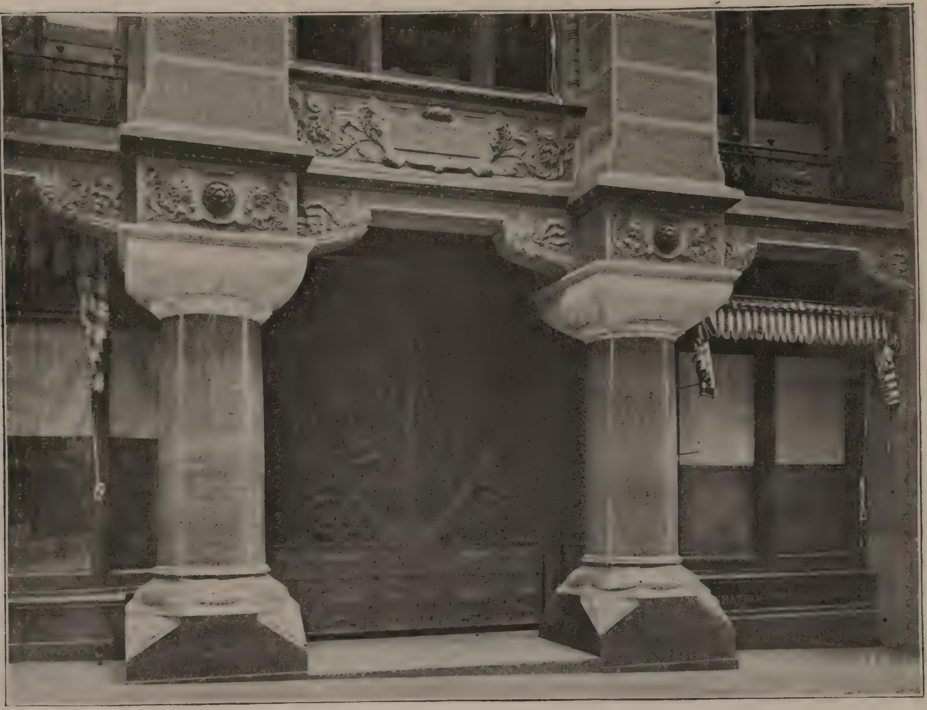
WESTERN UNION TELEGRAPH COMPANY'S BUILDING (1884).

Fifth Ave. and 23d St., N. Y. City. Henry J. Hardenbergh, Architect.

vents the design from making its full effect. But this is the sole drawback, and it does not prevent the Dakota from being by far the most considerable, architecturally, of all the apartment houses. The agreeableness of its composition and its detail is much enhanced by the agreeableness of its combination of color, the olive sandstone being employed in conjunction with a salmon-colored brick, and the darker tint being used with unfailing structural propriety to accentuate the design.

Before the Dakota had been completed, the first, or, at all events, the first that counts, of its author's commercial buildings had been begun, the Broad street office of the Western Union company. Its altitude of eight stories seems modest now, with its towering neighbors, but made it much more conspicuous fourteen years ago. The triple lateral division, doubtless determined by considerations of practical convenience, is architecturally effective and gives the front an impressive scale. Vertically, the composition is not so happy. The single story of stonework is inadequate as the base of an eight-story building, the more as it stands directly upon the pavement. Another story, similar in material and treatment, would have helped the proportion, and enabled the designer to make of his middle section a single and predominant feature. As it is, the composition is fourfold instead of triple, and the relation of the parts lacks the rhythmical result of a division that seems to come of itself and looks capricious and arbitrary rather than necessary and inevitable. It was undoubtedly a mistake to make two middle sections. If the basement had been of two stories instead of one, and four stories instead of three had been included under the segmental arches of what is now the fourth story, the front would have gained the unity which now it lacks. It is only fair to add that the basement is in itself very well designed, as is also the crowning member, including the double square-headed openings of the seventh story, the cornice and the range of dormers. The detail throughout is interesting in design and successful in scale.

It is gratifying to remark that the criticisms we have been making seem to have suggested themselves to the architect from the contemplation of his work in execution, and that when he had a subsequent building to do, for the same primary purpose, and of similar general requirements, he should have obviated them very successfully. For the building for the Western Union company at Twenty-third street and Fifth avenue is, in its kind, one of the most successful commercial buildings we have, and its quaint picturesqueness is the more valuable for seeming to have come unsought from the most straightforward treatment of the problem. Here, although the height is but of seven stories, two are unmistakably set off as the base, being divided from the superstructure by an emphatic string-course, still further accentuated by a decorated belt of terra cotta below it, and united in themselves by the withdrawal from the plane of the wall of the intermediate floor-line. This is subdued to a mere transom, but is yet of more importance in fact than it appears in the photograph in which it is so nearly obliterated as to give the openings a gaunt and spindling aspect which they do not really present. This is of course on the long side. The narrower front on the avenue, is but of twenty-five feet, about half that of the Broad street building, but it is a far more effective design. The treatment of the lower stage is especially ingenious. The large opening which extends through both its stories is closed by a segmental arch of which the piers seem an inadequate abutment. The abutment is accordingly reinforced and the thrust of the arch counteracted by a tie-rod, at the point where the opening is contracted by corbelling its sides inward. The tie-rod comes just below the floor-line, and is produced through the wall at the corner and emphatically capped with metal. This disposition is emphasized and decorated by the modelling of the piers and the corbels, and by the insertion in the upper and narrower stage of the opening of a light oriel in metal. While evidently proceeding from a structural necessity, and thus relieved of the impression of capriciousness, the feature is one of the happiest bits of our street architecture. The counterparting feature at the other end of the long front is almost equally successful in its way. Here the arcade ceases, the separation of the two stories of the basement united in the arcade is completed and emphasized by the re-emergence at the floor line of the string course of the other corner, and the wall is kept so solid as to provide a visibly ample abutment for the arcade. As is indicated by its separate and subordinate treatment, this end of the building contains the means of



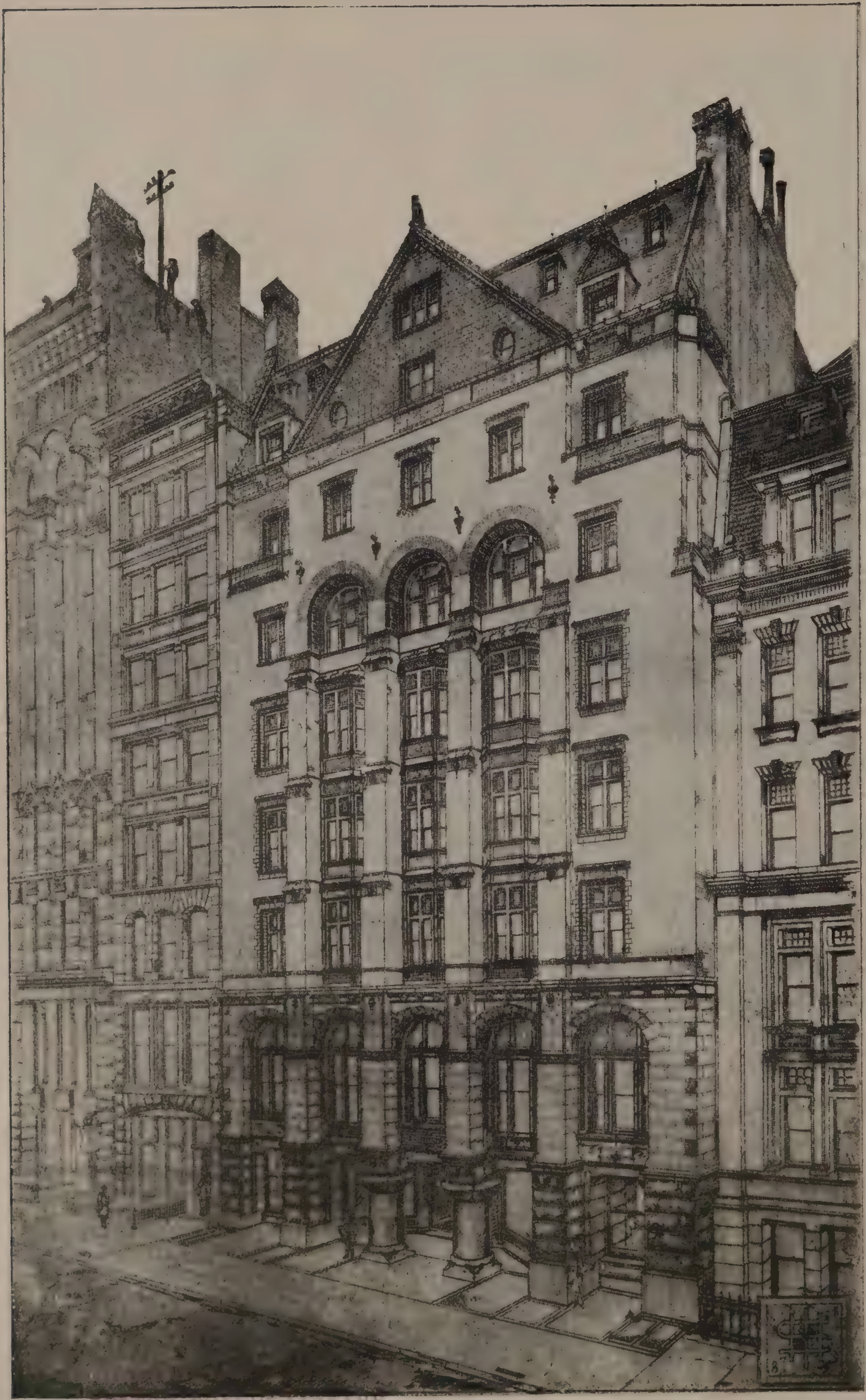
ENTRANCE TO THE ASTOR BUILDING.

Wall St., N. Y. City. Henry J. Hardenbergh, Architect.

access to the upper stories, and can properly be much more solid than the rest, the solidity being emphasized by the unbroken chimney shaft. Advantage is taken of this fact to diminish the window of the second floor, and to insert in part of its opening a panel which is one of the most idiomatic and successful pieces of decoration in terra cotta that are to be seen in New York. The proportions of the main divisions are just and harmonious. While the central three stories are kept plain, and the ornament reserved for the upper and lower divisions, one of the happiest points of the composition is the alliance between these, the recalling of the base in the design of the attic. This is effected in great part by the withdrawal of the upper story from the plane of the main wall, the substitution of the single opening of the basement for the small opening of the superstructure, the intermediate pier being reduced to a mere mullion, and especially by the reproduction in stone carving, upon the faces of the piers left in the plane of the principal wall, of the offsets which terminate the piers of the basement. The design of the roof, whether in the gable of the narrower front, or the dormers of the wider, with the characteristic treatment of their brickwork and of the metal in the connecting railing, fitly crowns the edifice.

The Astor building in Wall street is a work of the same period, and in this also the designer profits by the consideration of his own mistakes. The front is of some sixty-five feet, and thus sufficient to allow of an expression of breadth even in a commercial building of eight stories, which was about the vertical limit of commercial buildings a decade ago, far as it has since been exceeded. It was the limit, that is to say, before the steel frame came in to supplement the work of the elevator, the limit imposed by the necessity of employing real walls that would carry themselves, and of subtracting the area occupied by these supporting masses from the available space of the interior. The Astor is a very good example of this transitional class. The main motive is that of the Broad street building we have already considered, an arcade between a basement and an attic, but so much better worked out as to obviate the criticism suggested by the earlier work. Here the basement includes two stories marked by separateness of material as well as of design, dark brown stone supporting a superstructure of red brick, the arcade includes four stories instead of three, and a single plain story intervenes between it and the roof. All this is a decided improvement. Moreover, the additional width gives an opportunity for framing the arcades at the sides with flanks of wall, kept as solid as may be, and, by supplying an evidently ample abutment to the central arches, for imparting an aspect of strength and repose which cannot be gained when an arcade is enclosed only between thin piers. This disposition enables the designer to attain, without forcing it, unity in the upper division. The gable covered with an effective diaper in terra cotta appropriately crowns the central division containing the arcade, while the sides are withdrawn above the arcade and crowned by the main transverse roof. All this is discreetly and skilfully carried out and the result is very satisfactory. Satisfactory also is in general the treatment of the basement, of which the unity is maintained by carrying the piers through both stories unbroken, the floor-line being indicated by transoms of stone corbelled out from the piers. The one questionable point in its design is the reduction of the bases of the central pier into dwarf columns to signalize the entrance. This is disputable, from the awkwardness of the superimposing upon a modelled pier of an unmodelled pier of greater area than itself, and the look of weakness thus given, which is only in part counteracted by the equally evident fact that the polished granite of the columns is stronger than the sandstone of the piers. It would probably have been better to signalize the porch by an enriched entrance between the piers. But if we waive this, we must own that the columns are very vigorously modelled, and that their detail, as well as that of the shouldered lintel between them, is very clever and happy, and makes up what is in itself an extremely effective feature.

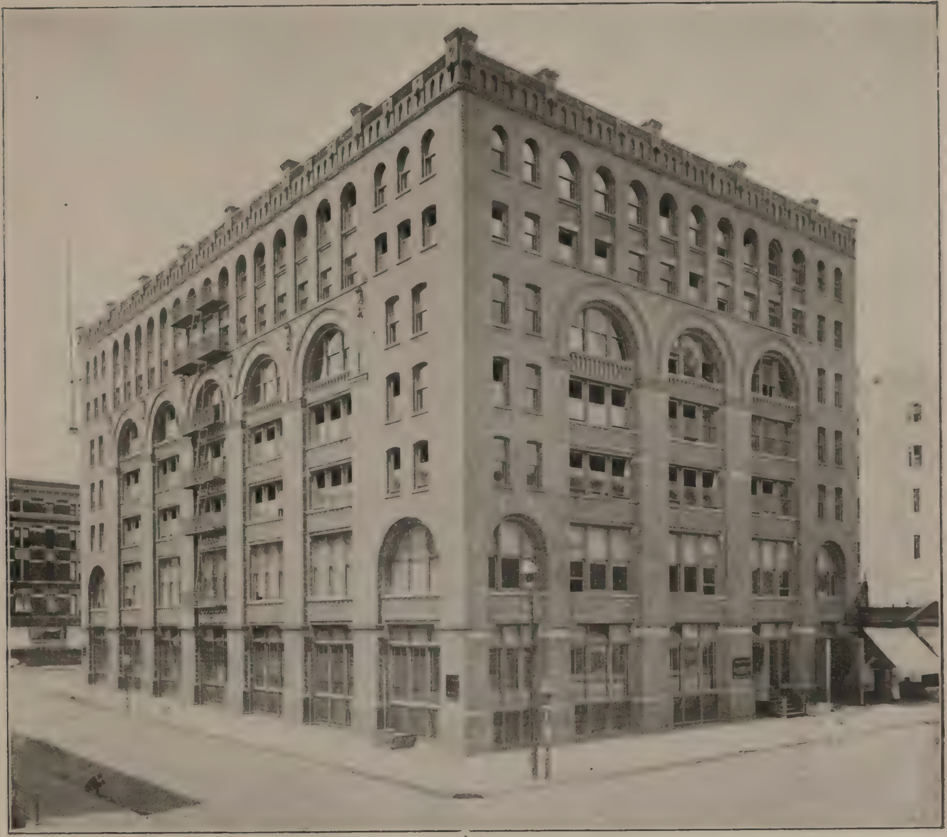
In another noteworthy commercial building of Mr. Hardenbergh's, though this time a store and warehouse and not an office building, at the corner of Great Jones street and Lafayette place, the peculiarity of design we have been criticising in the Astor building is carried very much further. The main structure within two solid flanks of wall at the extremities that seem to be assigned to the staircases and elevators, is a skeleton of brick piers, and each one of these is modelled at its base into a dwarf column like the columns of the Astor entrance, but more squat, since they extend upward only to the impost of the arches of the first story; and since they are here of sandstone instead of granite, they are open to the same objection, logically, with the others, but the force of it seems to be weakened by the powerful effect of multiplication. The rows, four on one front and five on the other, certainly make an impression, and an impression primarily of massiveness, though they are in fact so much less massive than the piers they carry. The design of the capitals and bases, simple even to rudeness, and emphasized by contrast with the more developed modelling of the enclosing wings of wall, promotes this effect. If the scheme is not successful it is certainly interesting and that may be said of the design of the building in general, which presents a number of novelties provocative of interest. One of these is the unusual employment of color. The difference in the tint of the brickwork, light buff and dark brown, is an integral part of the design. The darker color is em-



BOSTON PUBLIC LIBRARY

THE ASTOR BUILDING (1885).

Wall St., N. Y. City. Henry J. Hardenbergh, Architect.



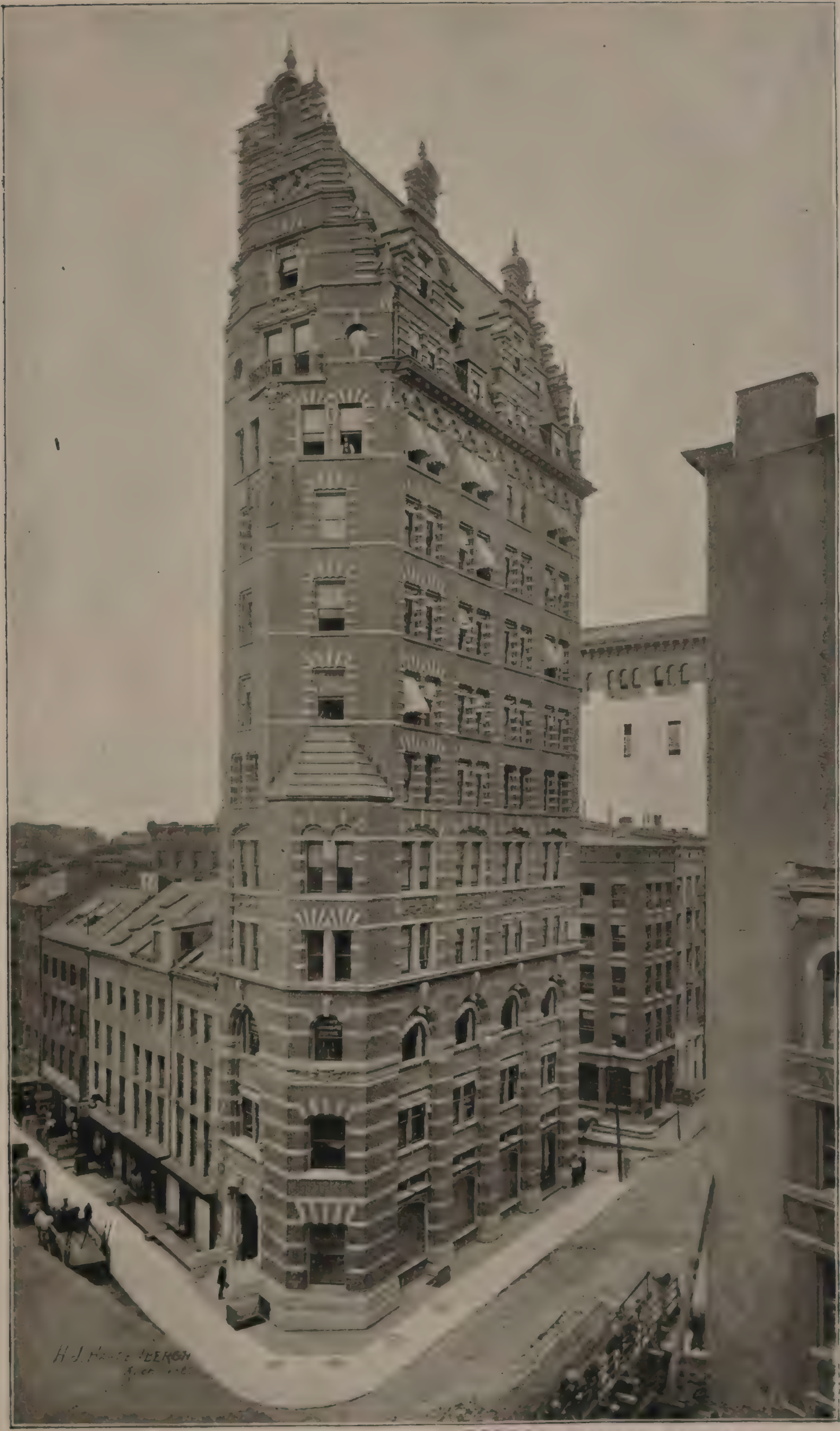
WAREHOUSE (1892).

Broadway and 51st St., N. Y. City. Henry J. Hardenbergh, Architect.

ployed to emphasize the structure. The piers that form its skeleton, with their connecting arches, are built of it, and the walls of the pavilions up to the top of the second story, while above this point the walls of the pavilion as well as the wall of the building between them is in the lighter material. This seems logical, but in fact it produces the effect of a frame weaker than the thing framed, an effect which is not dispelled by the expedient of quoining the outer edge of the wall in the darker brick, like giving a strong black outline in a drawing. Undoubtedly the enclosure and abutment of the arcade would be more competent if the outer walls had been laid in the darker brick, but this with the light brick retained in the fifth and sixth stories would have given the building the effect of being designed in layers, which the designer was very properly anxious to avoid. It is not clear how the scheme could have been better carried out, and yet the execution of it is evidently not satisfactory. Another questionable point is the withdrawal of the plane of the pier as well as of the walls, above the second story, and the masking of the offsets, in the piers themselves, by the canopied gablets. This device serves the purpose of designating the lower two stories as the architectural base, but it seems that it should have been supplemented by a still further differentiation. On the other hand, the treatment of this lower stage in the flanking pavilions is as good as can be, the openings rather emphasizing than enfeebling the solidity of the mass, and its visible sufficiency as the frame and abutment of the arcade. The upper stages are almost equally good, though the detachment from the building might, with advantage, have been made more complete, and the picturesque crowning features correspondingly more effective. The detail is well studied throughout, and the drawbacks to the complete success of the building are defects in the execution of a scheme as difficult as it is interesting.

A warehouse, which is also apparently a factory, at the corner of Seventh avenue and Fifty-first street, aims, architecturally, at nothing more than inoffensiveness, but it attains this negative object with such success as to make it positively attractive. There is scarcely an ornament in it, excepting the detail of the anchors and fire escapes in metal. The stone capping of the basement piers shows no more elaboration than is necessary to define the stone binders, and the mouldings of the large arches are likewise the simplest possible definitions. The cornice and the transoms that mark the floor-lines in the arcades show patterns that are formed by the bricklayer, and the capitals of the piers are likewise mere exercises in bricklaying. The design resides purely in the disposition of the masses, and is especially exemplary because it is attained with scarcely any interference with the equal spacing of the openings, which in such a building is practically desirable. Yet, by mere force of this disposition, the factory becomes a work of art. The terminal piers are in fact but little wider than the intermediate piers, but they completely assure the eye of their sufficiency. The effect of the building comes mainly from the reinforcement in the design of these angles. Whereas the whole central part of the building is treated as an arcade four stories high, three bays wide on the narrower front and five on the wider, the bay at each end is left plain and unbroken except for the necessary openings, which do not at all impair its effect of massiveness. The difference between centre and wings, though the piers are in the same plane throughout, is emphasized at the base by the single arch in the second story, and at the top by the withdrawal of the floor-line at the centre from the plane which is kept in the ends so that these count as solid and fortified masses. This work is especially exemplary because of its perfect plainness, and it shows that buildings of a class which are not commonly regarded or treated as works of architecture at all can become so with no other additional expenditure than that of thought on the part of the designer.

None of these buildings, however, is a "skyscraper," in the acceptation of that term, which requires a minimum of ten stories. Neither is any an example of the steel-frame construction in which the structure, instead of consisting of visible walls, is only masked by them. The latest of our architect's commercial buildings is a skyscraper, in both these senses, and it is a great encouragement to find it by far the best of all. Not only that, but it is one of the very few examples we can adduce to show that the skyscraper is artistically tractable, if it be intrusted to an artist. I have already, and in these pages (Architectural Record, Vol. V., No. 3), described this work at greater length than is possible under the present limitations. It must suffice here to indicate how unpromising the conditions were for an artistic success, and how such a success has been won in spite of them. The site is evidently inadequate in area as the site of a twelve-story building, and it is not only inadequate in size but irregular in shape. This irregularity seems to deal the final blow at any attempt to make a work of art out of a twelve-story building on such a site. Most architects—even artistic architects—would give it up when the plot of the site was put before them; would content themselves with a "swagger" entrance and an umbrageous and elaborate cornice and a wall between of no pretence of architectural interest. In fact, we have a building which is studied in every story and

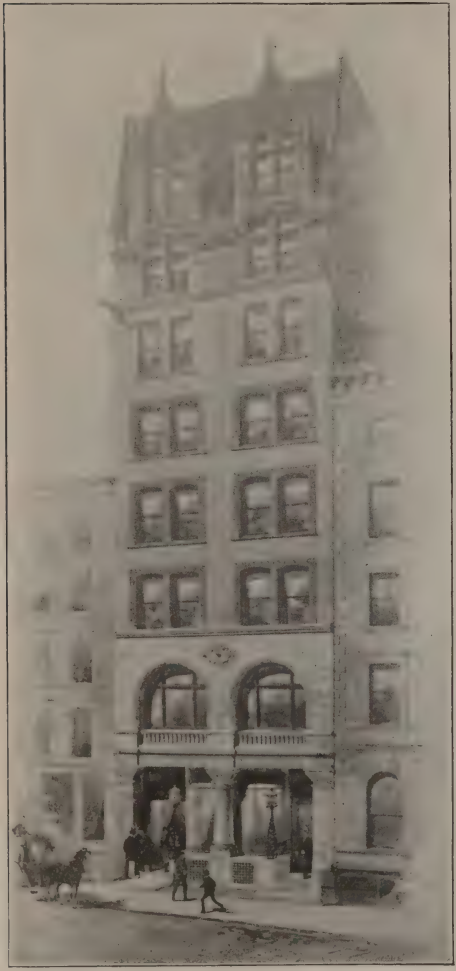


BOSTON PUBLIC LIBRARY.

THE JOHN WOLFE BUILDING (1895).

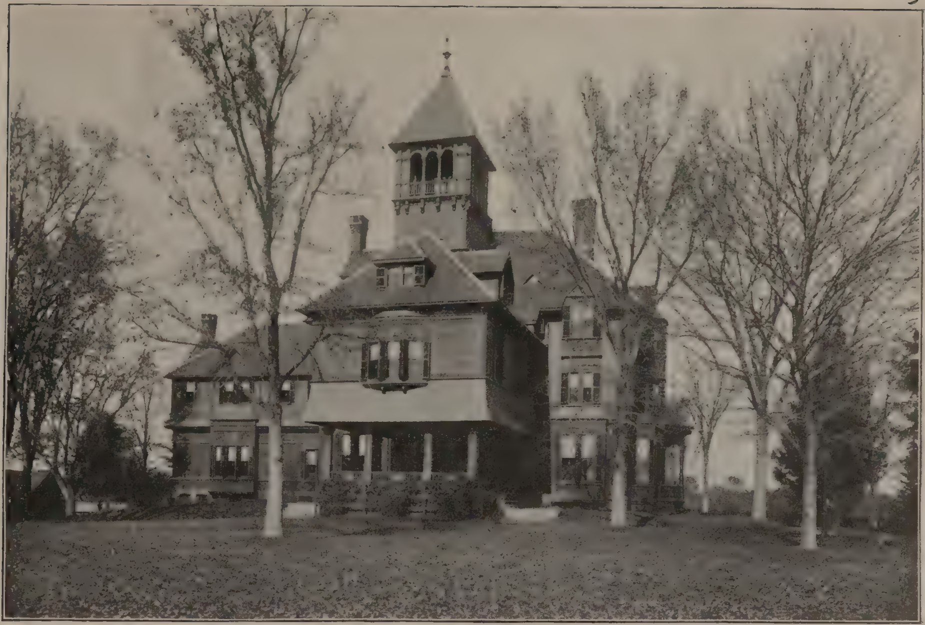
Maiden Lane and William St., N. Y. City. Henry J. Hardenbergh, Architect.

at every point, and so successfully studied that it becomes a highly picturesque object, as impressive in mass and outline as it is interesting in detail. This is a very rare success. And observe, moreover, that the individuality and picturesqueness of the building come not by ignoring or shirking any of the hard conditions of the problem, but by faithfully grappling with them. It is indeed from these very conditions that the individuality of the work in great part proceeds. Out of this nettle danger the artist has plucked this flower safety. What, at the first view, could be more hopeless than the predicament of an architect required to rear twelve rentable stories at the acute angle of this site and make the result presentable? The difficulties have been so triumphantly overcome that they become factors in the success. Is there anything happier in contemporary work that the art with which the acute angle, bevelled by successive truncations, becomes an equal half of a front which by another truncation gains a central and dominating feature? To appreciate how good it is compare it with the buildings offered by other designers as solutions of somewhat similar problems. Mr. Hardenbergh has here so overcome the difficulties that it is only the critical spectator who infers them, whereas other buildings in similar situations continue, after they are completed, to bristle with the difficulties of the original problem.



LONDON AND LANCASHIRE FIRE INSURANCE CO.
William St., N. Y. City. H. J. Hardenbergh, Ar't.

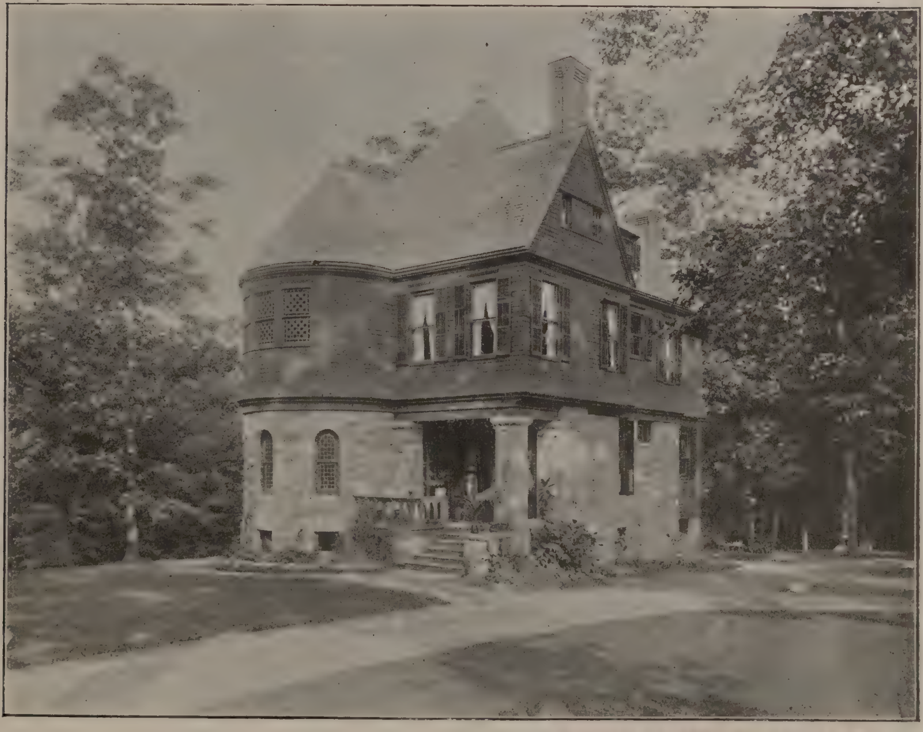
Designing country-houses is not perhaps the line of professional employment that is likely to be most conducive to an architect's fortune or to his fame, unless, indeed, he have the luck of building palaces at the summer resorts. But it must be about the most amusing department of design, seeing that the limitations of space and neighborhood that restrict him in urban work are removed, and that he is at liberty to plan his dwelling according to the needs of his client and the lay of the land, and to carry out in his exterior the architectural indications furnished by the plan. The expressiveness and the effectiveness of the result are subject to no conditions except that of expense and of the limitations of his own talent. In proportion to the whole body of his work, Mr. Hardenbergh's country houses are not very numerous or important. Perhaps the most important of them is the house on the shore at Mamaroneck, which those who have seen it will agree to be highly successful. Those who have not seen it will not be able to appreciate it from a photograph which, effective as it is by itself, can show but one of four faces, and can not show at all the de-



COUNTRY HOUSE (1884).

Mamaroneck, N. Y.

Henry J. Hardenbergh, Architect.

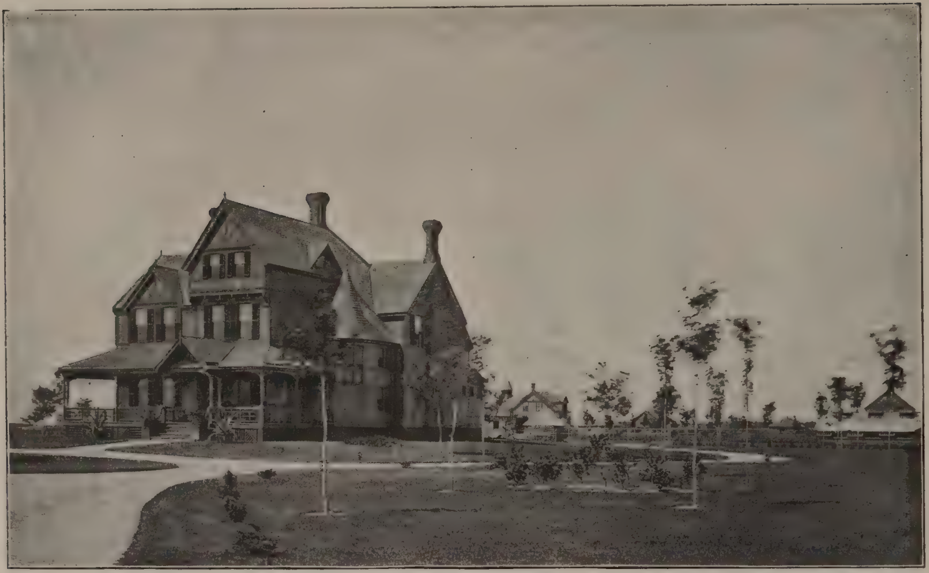


COUNTRY HOUSE (1887).

BOSTON PUBLIC LIBRARY.

Orange, N. J.

Henry J. Hardenbergh, Architect.

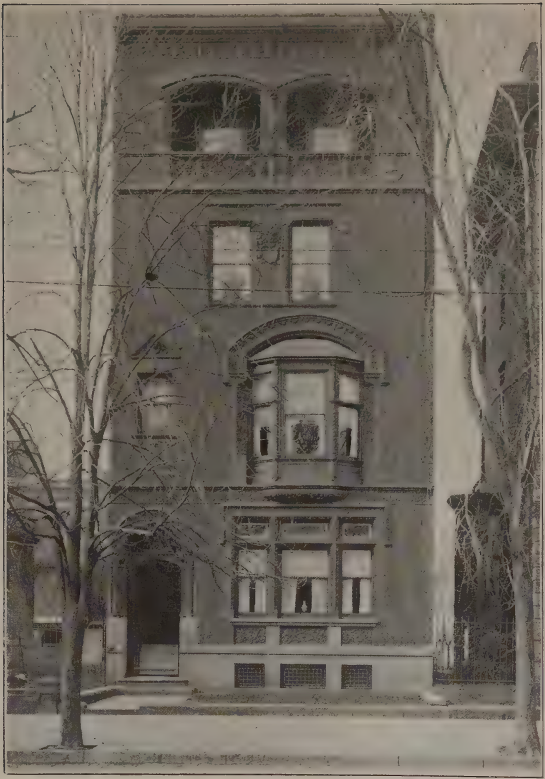


COUNTRY HOUSE (1881).

Babylon, L. I. Henry J. Hardenbergh, Architect.

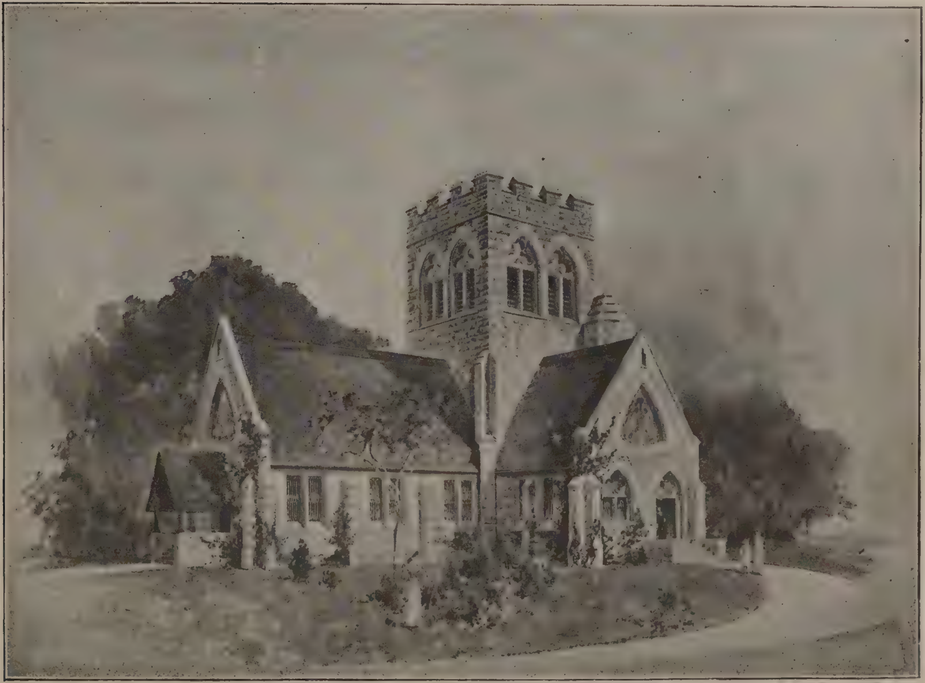
pendencies which in fact add so much to the effect of the house and extend it into a "place."

Town-houses, and especially town-houses which, like the great majority, consist, architecturally, only of street fronts, are in a very different category. Here congruity is the first thing to be considered. A clever design, which puts its neighbors unnecessarily out of countenance, and makes the block front of which it forms a part uglier than it would otherwise be is by no means vindicated by its own superiority, or by the fact that it would be good somewhere else. Conformity is here one of the first requisites. Although of course it is not to be demanded of a cultivated designer that he shall reduce himself to the level of an uncultivated designer for the sake of conformity, it is to be demanded of him that his "purple patch" shall not hold the garment up to public odium. It seems to me that in the single dwellings here illustrated Mr. Hardenbergh has kept this civic duty well in view. The dwelling in West End avenue is in place where it stands, although it is by no means fortunate in its immediate neighbors. On the other hand, it would be very much out of place in lower Fifth avenue, while the street front in the latter quarter would be unconscionably queer if it were transported to the West Side. Flanked and surrounded by the demure bourgeoisie of the architecture of two generations ago, it is very discreetly adapted to its place. There is no affectation of reproducing one of the old fronts on the part of an architect who knows better. The new front is frankly half a century later than the old mechanic's work. But it does not show the old any wantonness of insult, and it adds a touch of picturesqueness to the prim respectability of its predecessors without disturbing that quality. A less hampered design, though still architecturally only a street-front, is the dwelling in Newark, in which the sacrifice of symmetry to convenience, though emphasized by the return to symmetry in the upper stories, does not entail weakness or lack of repose, while the detail in terra cotta is interesting and ingenious and the double loggia of the upper story is a notably effective feature.



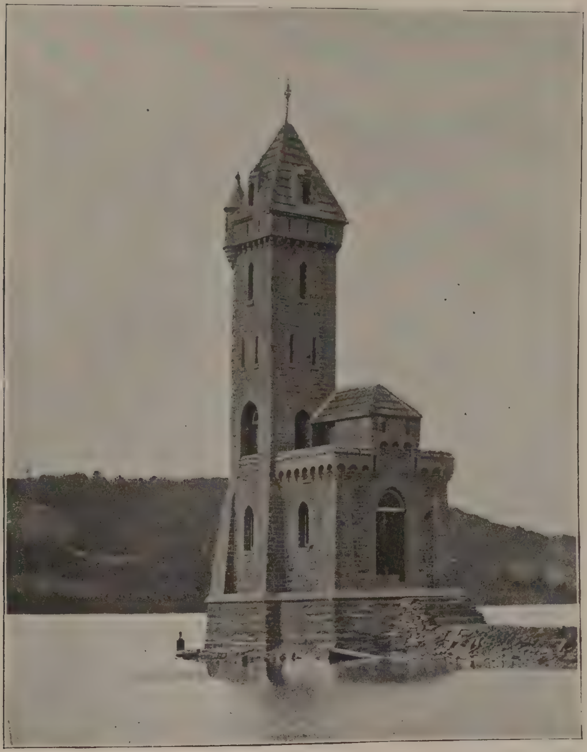
BOSTON PUBLIC LIBRARY

Newark, N. J. DWELLING (1887). Henry J. Hardenbergh, Architect.



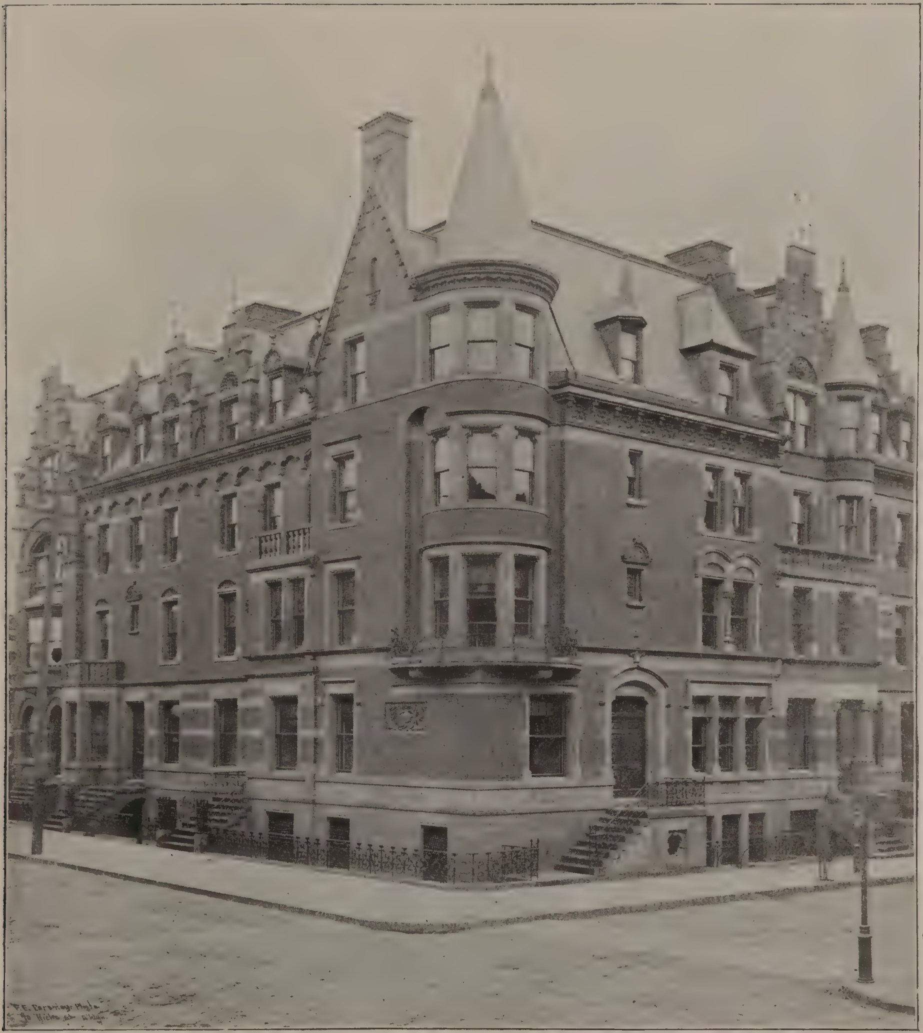
BOSTON PUBLIC LIBRARY

Roxbury, N. Y. JAY GOULD MEMORIAL CHURCH (1894). Henry J. Hardenbergh, Architect.



Otsego Lake, N. Y. WATER TOWER. Henry J. Hardenbergh, Architect.

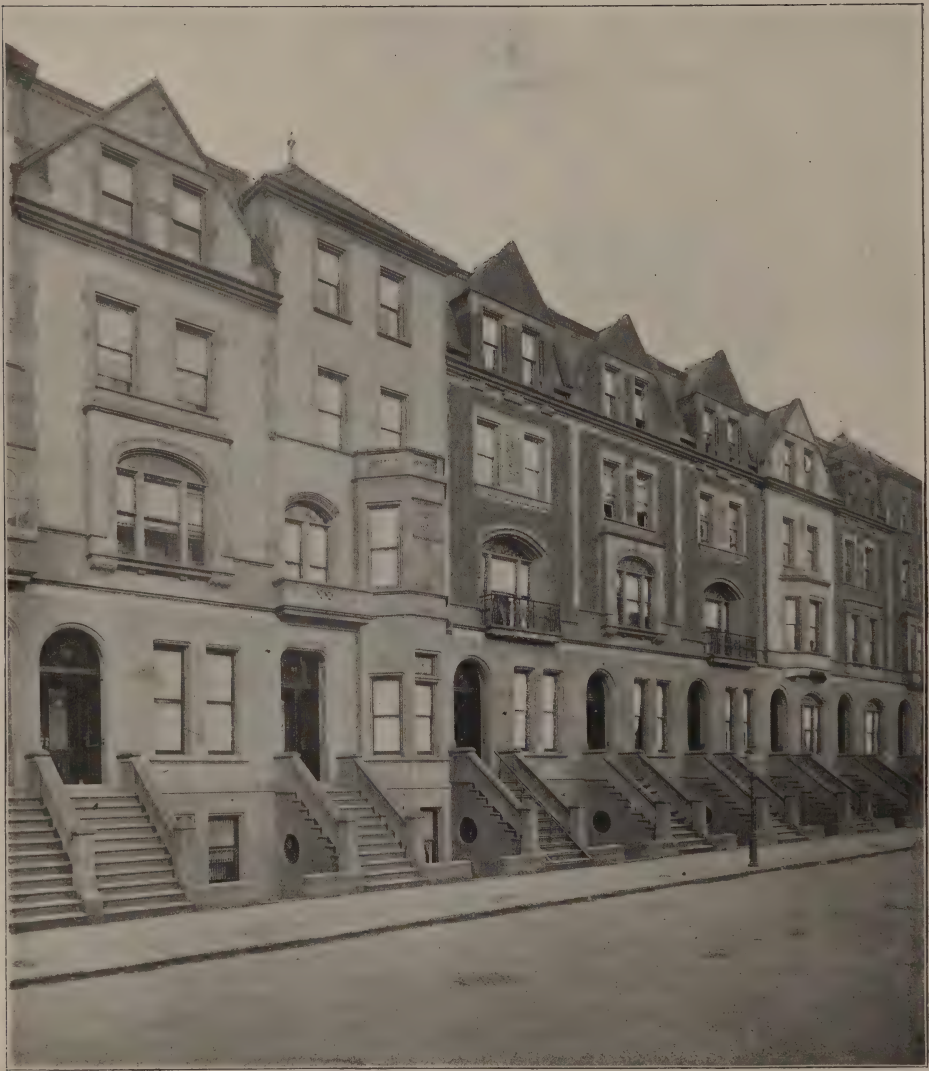
A much more complicated problem than the design of a single street-front is the design of a row, so as to preserve a unity of aspect while individualizing the various dwellings that make it up. A generation ago this was not a problem at all. The speculative builder who at that time housed the well-to-do of the population of New York, after his draughtsman had produced one elevation of a brownstone front with the conventional "trimmings" merely repeated that front in the same material as many times as he had houses to build. Unity was doubtless thus preserved, but inasmuch as the single design that was repeated was of no interest whatever, it became extremely dismal by repetition. There are few things more depressing than a blockfront in a fashionable quarter, erected between 1860 and 1880, and it may well have seemed that nothing could be worse. But worse remained behind. When the West Side was opened for settlement and the speculative builder was credibly informed that the buyers and even the tenants of dwelling houses demanded "variety" in the fronts, he set himself to supply the new demand by instructing the same incompetent draughtsman whom he had before instructed to make the fronts all alike, to make them all different. The results were awful. Instead of producing mere melancholy the new order threatened the reason of the spectator, and in contrast with the wild work of the draughtsman goaded to be various, his tame work when he was allowed to be monotonous seemed to take on repose and dignity. The just mean was not for him to attain. Of the comparatively few competent architects who have striven to attain it Mr. Hardenbergh seems to me to have been pretty clearly the most successful.



DWELLINGS (1887).

BOSTON PUBLIC LIBRARY.

Lexington Ave., New York City. Henry J. Hardenbergh, Architect.

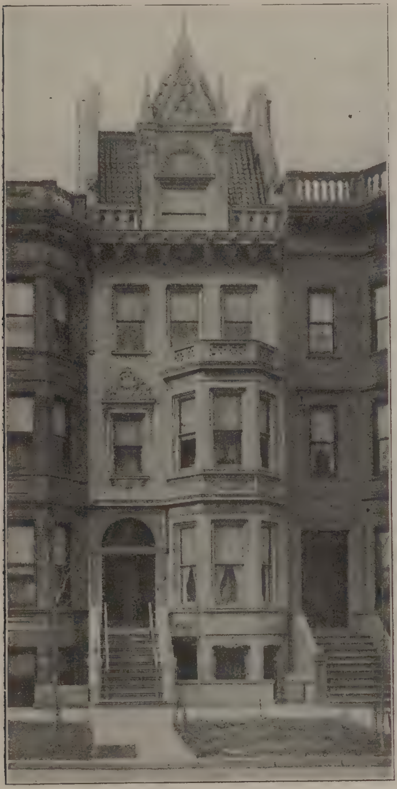


BOSTON PUBLIC LIBRARY

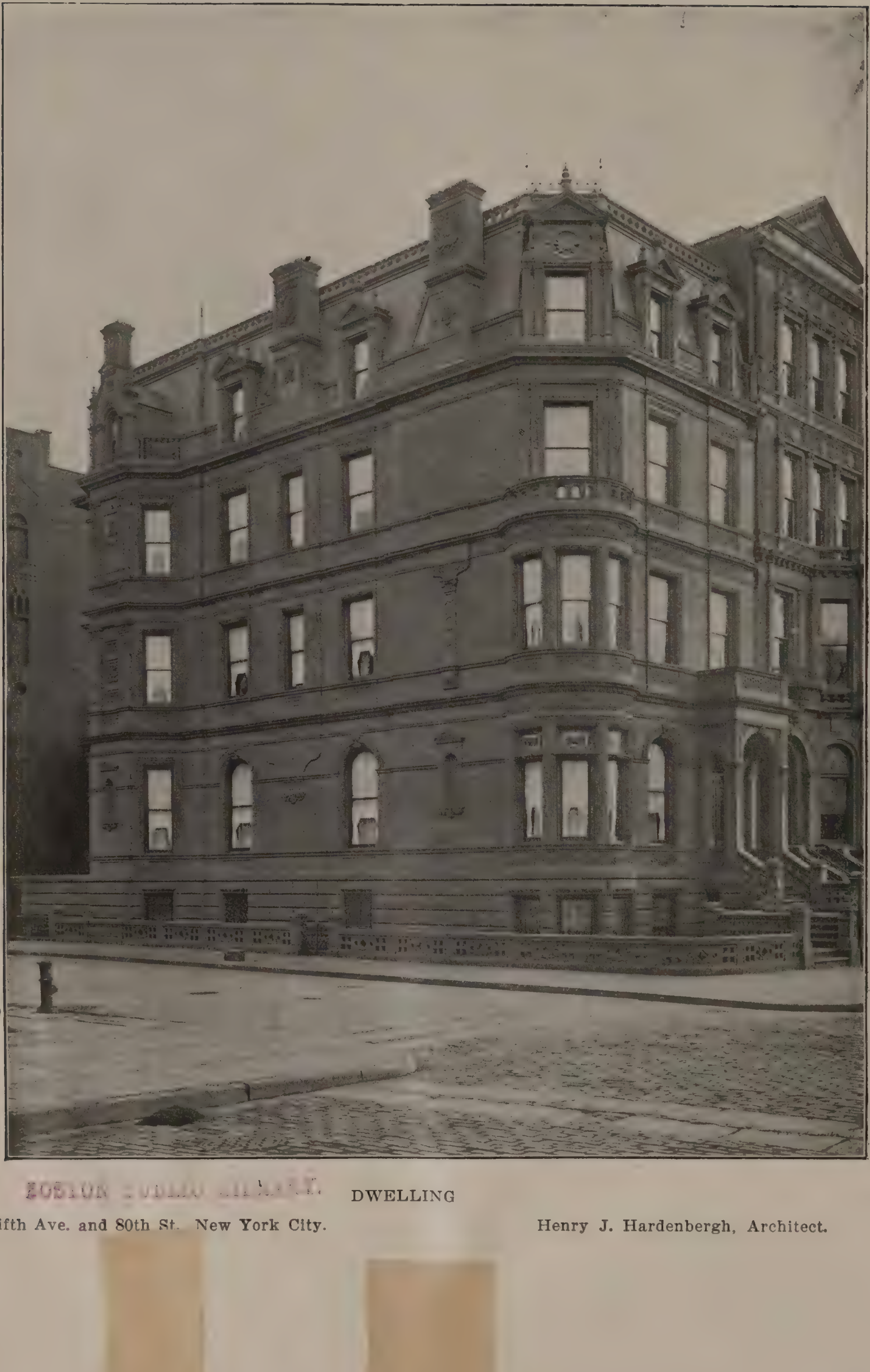
DWELLINGS (1883).

West 73d St., New York City. Henry J. Hardenbergh, Architect.

There are scattered about New York, and especially in the region between the Park and the East River, a considerable number of rows, of from three houses to three times as many, of which the design identifies them as his work by those who are familiar with it. They are decorous edifices, of which the detail shows study and refinement, but in general the houses in each row repeat a single design. In two conspicuous instances, however, he has gone further and attempted to make a composition of a group of dwellings while distinguishing the components. The earlier and the more extensive of these is the block-front opposite the Dakota, lining the north side of Seventy-third street from Eighth avenue to Ninth. There are twenty-seven of the dwellings, besides the taller apartment house at the corner of Ninth avenue, which is included in the architectural scheme. The effect of unity is given by the facts that the two-story basement of olive sandstone is continuous from one end of the row to the other, emphasized at the ends by including an additional story, and that the moulded cornice of the same material is continuous, except where it is suspended to admit of the treatment of the upper story as part of the wall and not as a roof story. The differences are enough to secure variety without carrying it to the point of violence. The second story of each dwelling shows a feature, which is now a corbelled oriel, now the upper stage of a two-story bay, now a projecting window in stonework, and now a recessed arch with a balcony. Continuity is again preserved in the similar design of the third story throughout, and variety again secured in the treatment of the crowning story sometimes as a full fourth story with a hipped roof, sometimes with a gable occupying the whole front, or a gabled dormer, or two separate dormers relieved against the mansard roof. These devices avail to avoid monotony without disturbing repose. Another expedient for avoiding monotony, though quite effectual for its purpose, is more questionable, and that is the use of different tints in the brickwork of the superstructure, red brick being employed in rather more than half the fronts and buff in the remainder, though the party wall is in every case indicated by a line of quoining. Upon the whole, it is likely that the row would have seemed monotonous without this device. The occasional interpolation of a lighter front in the monochrome of red would be enlivening, but the mass of the two materials, though it is not equal, being about in the proportion of one and a-half in the stronger tint to one of the weaker, is perhaps too nearly equal for the best effect. Another defect, which is also a defect of the Dakota, as we have noted, is a want of decision and vigor in the modelling of the detail, and this entails a certain tameness.



DWELLING (1894).
West End Ave., New York City.
Henry J. Hardenbergh, Architect.



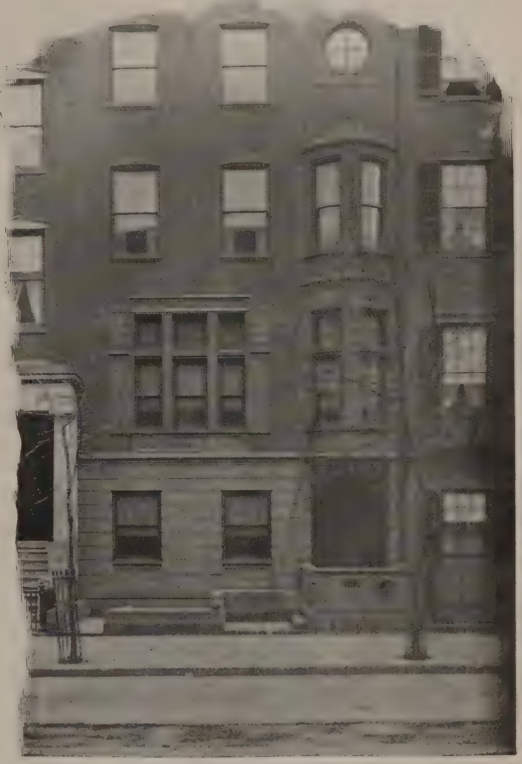
BOSTON PUBLIC LIBRARY.

DWELLING

Fifth Ave. and 80th St. New York City. Henry J. Hardenbergh, Architect.

But this defect does not prevent the treatment of the row from being in many respects a model, the more creditable to the designer when we consider that it is a work of 1884, when there were no precedents for such an attempt at unity in variety, and when the choice was between rows depressingly tame and rows outrageously wild. This work set a precedent, and a valuable precedent, albeit neither its author, nor, so far as we recall, any other designer, has been encouraged to repeat its most striking peculiarity, the change of material. It would no doubt have been better if the color had been used to accentuate the architecture, in particular if the ends of the row had been in the stronger color, and if this had been employed throughout to emphasize divisions and projections, while the intervals were left in the weaker, the actual arrangement being the reverse of this.

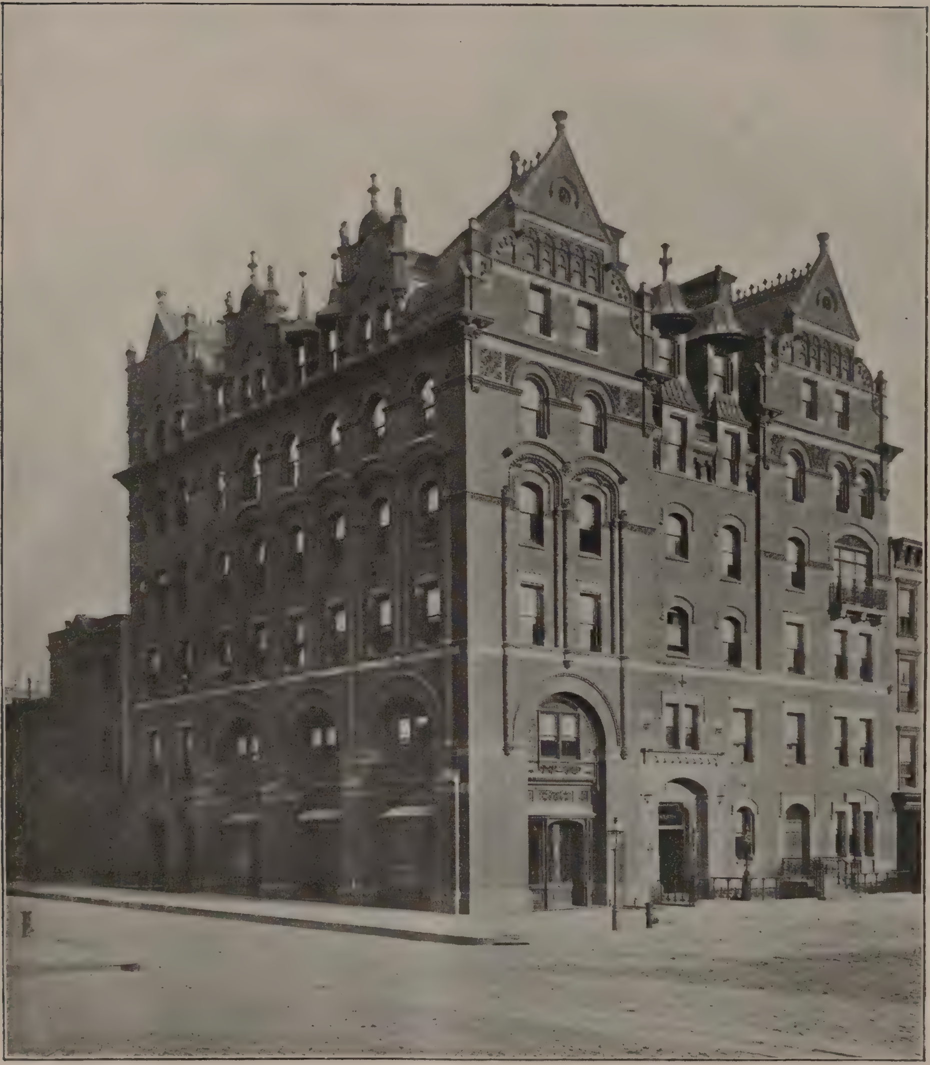
For which reason, among others, a later work in the same kind, a group of dwellings at the corner of Lexington avenue and Eighty-ninth street, seems to me more successful than the earlier essay. There are eleven houses on a plot 150 feet by 100, and they are consequently less spacious than those we have been considering. Seeing that the plan involved the occupancy of the corner by two sides of the nearly square house which is considerably the largest of the group, it is evident that the remaining houses must be packed very closely, and in an attempt to individualize them while uniting them into a group the danger was of a huddled effect. It cannot be said that this danger has been entirely avoided. They do look crowded, especially upon the longer front, and that is the chief drawback to the complete success of the group. But when one considers the conditions, the wonder is that the designer was able to attain so much as he has attained of breadth and repose. This is largely the result of the fortunate treatment of the corner house, in which at the most important point of his composition, he was able, without any practical sacrifice, to retain considerable masses of virtually blank wall, and to get a notably massive pier at the angle itself. Above this the three-story oriel, with its steep hood, not only makes a very picturesque combination with the steep gable on one side of it, and the expanse of roof on the other, relieved by its unequal dormers, but it supplies a central and dominating feature upon which the two fronts may converge. This it does very successfully, and the success is a proof of the care with which the design has been studied in perspective as well as in elevation. Each front is, moreover, in itself a composition having an effective balance if no formal symmetry. The end house in each is projected enough to denote that it is the terminal feature, and the interme-



DWELLING (1884).

Lower Fifth Ave., New York City.

Henry J. Hardenbergh, Architect.

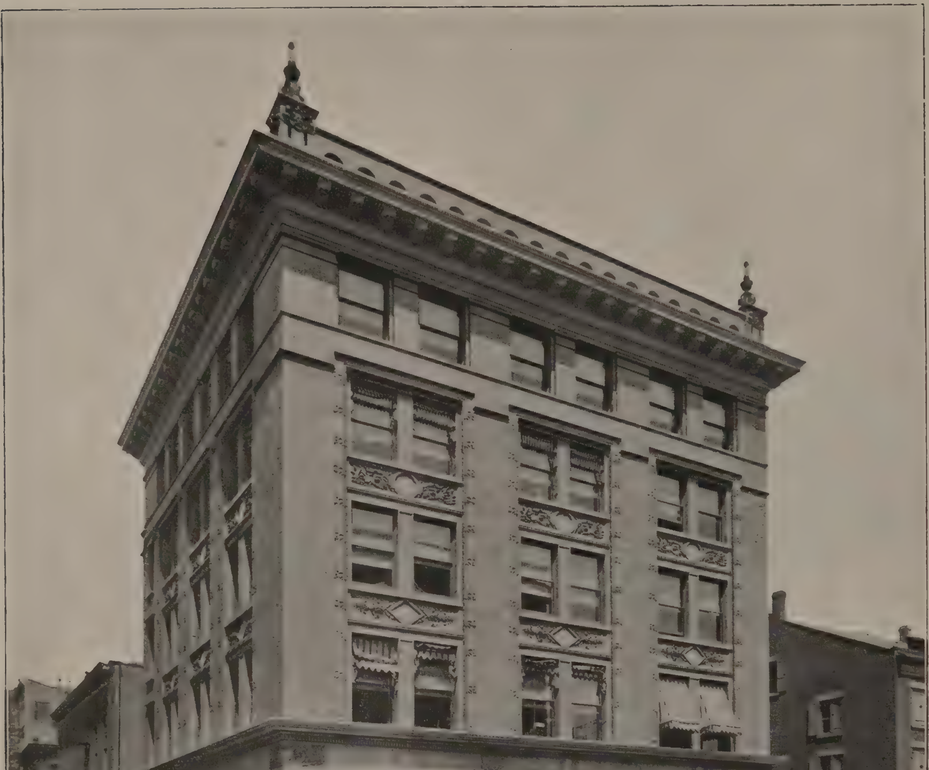


ADELAIDE APARTMENT HOUSE (1887).

635 Park Ave., New York City. Henry J. Hardenbergh, Architect.

diate houses treated as a curtain wall between two pavilions, while they differ quite sufficiently among themselves. One might say that they differ too much among themselves. On the long side the division adopted, no doubt, from a consideration of the probable preferences of tenants, of the houses into "high-stoop" and "basement" made impossible the carrying through of any horizontal lines, even of the line of a common cornice. The shorter front, in which the main lines are continuous between the pavilions, is for this reason the more effective composition, although compared with almost any other effort of the same kind the long front is very successful. The most decided advantage these houses have over the earlier row is in the character of the detail. There is here no lack of vigor and spirit in the modelling, and the successful adjustment in scale of the features and the detail shows the more practiced hand. The things, the crow-stepped gables, the shell-frieze in terra cotta, the balconies, and the porches, all good in themselves, are all better in their places. This, no more than the earlier work, aspires to the praise of academic correctness, and many of its features are of the French Renaissance in which that may be said, though very loosely, to have been designed. But along with the shell-frieze appear here the crow-stepped gables and other features that tell of a Batavian origin and are certainly of a quaint and attractive domesticity. This unpretentious group of dwellings is not the least successful of its author's works, while it is one of the most exemplary.

One curious result of the elevator and the Chicago construction has been to diminish the architectural importance of public buildings. A municipal "institution," when it comes to house itself, has the choice between putting up a building impressive by its magnitude, indeed, even among its purely money-making neighbors, but in which its own quarters are merely an incident, and putting up a building for its own exclusive use, and no bigger than it needs, which will be dwarfed by the neighborhood of more impressive buildings for less impressive purposes. Neither horn of the dilemma is really eligible, and the dilemma is not conducive to the construction of a city, in which the magnitude of buildings should bear a proportion to the importance of their uses. But of the two it is more to be desired that an institution should house itself by itself, at the risk of being effaced by towering neighbors, than that it should efface itself by occupying only a small part of its own building. The Fine Arts building is a case very much in point. The dimensions of its front are not far from those of the front of the old Academy of Design, which is indeed no taller than the dwellings that adjoined it when it was built, but which then dominated them by force of architecture, although it has lately been belittled by a commercial neighbor. The Fine Arts building, though built in what is still a residential quarter, is overborne by the huge and ugly apartment house which almost adjoins it. But, in this case as in the earlier, the smaller building is difficult to kill. The Fine Arts building is noteworthy among Mr. Hardenbergh's works as the only one, so far as I know, in which the main motive of the composition is borrowed. This is quite frankly and avowedly a copy of the so-called House of Francis I. at Paris, of which not only the composition but the scheme of decoration and some of the detail is reproduced. The original, however, is but of two stories, and without a visible roof, the third term of the proportion being supplied by the revetment of the terrace with its balustrade upon which the building stands. The place of this is taken in the reproduction by a basement which unfortunately the practical exigencies compelled the designer to make the most open and least massive division of his front, to attenuate the terminal piers to the limit of safety, and to impair the force of his main motive, an open centre between solid wings. The impairment is reduced to its minimum by the perfect simplicity



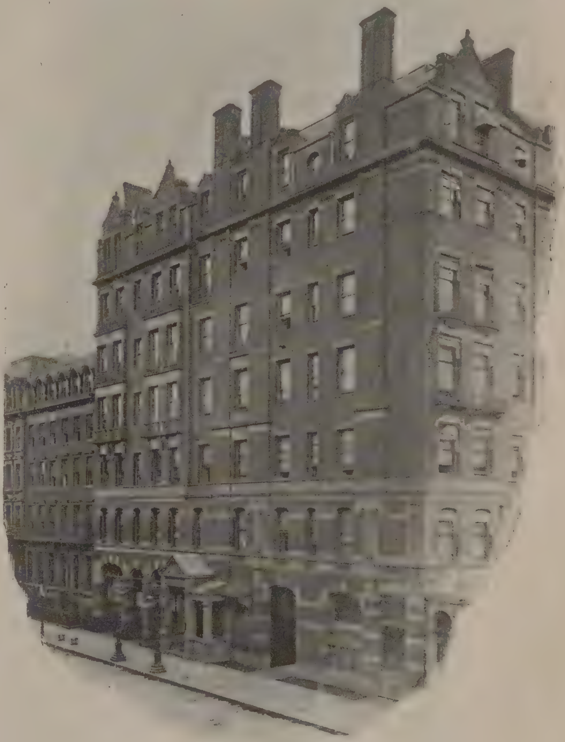
BOSTON PUBLIC LIBRARY.

OFFICE BUILDING (1893).

Front St., New York City. Henry J. Hardenbergh, Architect.

of the treatment of the lower openings, but it is necessarily injurious. Another addition to the original is the visible roof, and the treatment of this is not so fortunate. It is pretty plainly either too important or not important enough. The treatment or the lack of treatment indicates that it is meant to be as much as possible ignored. But as it is not possible wholly to ignore it, it seems that it would be the better for a crowning feature which should emphasize the disposition of the main wall. Here this is continued only by the opening in a balustrade of the centre of a parapet left solid at the sides. This, like the powerful cornice underneath, is an innovation, and a happy one. Although the front of the Fine Arts building makes something of the same effect of a union of massiveness with elegance that is made by its original, it is by no means so ornate, and lacks the chief enrichment of the belt of sculpture between the two stories, a feature which would especially lend itself to the plasticity of terra cotta, albeit the front of the Fine Arts building is in cut stone. In spite of the abatements it is a taking front and an addition to the short list of our public buildings that are worth talking about.

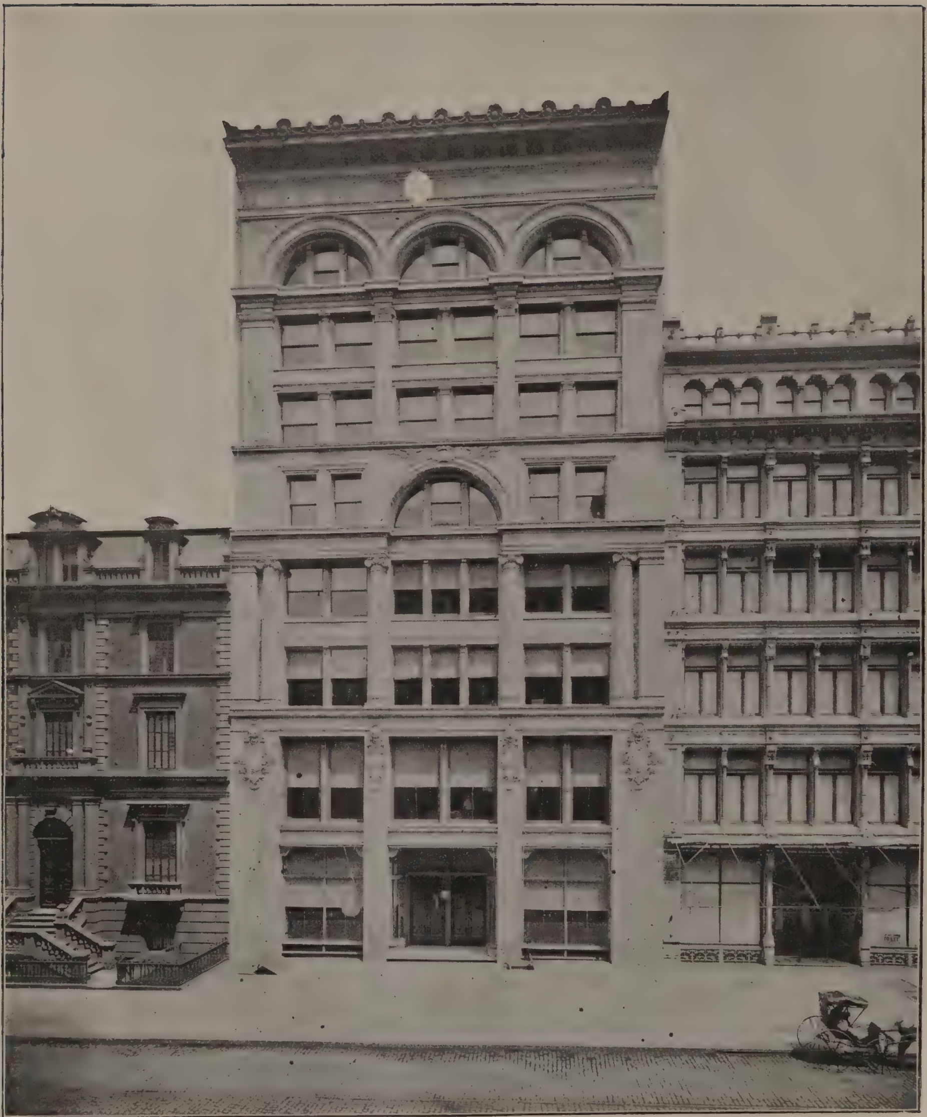
By far the most conspicuous and familiar of Mr. Hardenbergh's works are the three great hotels which have been erected in the middle part of New York from his designs since the elevator and the steel frame have done their perfect work. The series furnishes an interesting exemplification of how fast we have moved in these things, for the Waldorf, the eldest of the series, is scarcely five years of age, and yet it is already somewhat antiquated by its towering neighbor. Not that in the interval any radical novelties in construction have been introduced, but that architects have been emboldened to push the existing system further towards its logical development, a development which at present seems to be arrested, it would be hard to say why, at fifteen stories. In hotels, at all events, this seems to be the *non plus ultra*, and it seems likely to be the accepted ultimate in commercial building, in spite of the almost necessarily ungainly exceptions. To multiply by three the capacity of a given piece of ground is a sufficiently revolutionary performance to be accomplished within a quarter of a century, and to minimize the architectural dislocation entailed by it a sufficiently trying problem for designers.



HOTEL ALBERT (1883).

University Place, New York City.
Henry J. Hardenbergh, Architect.

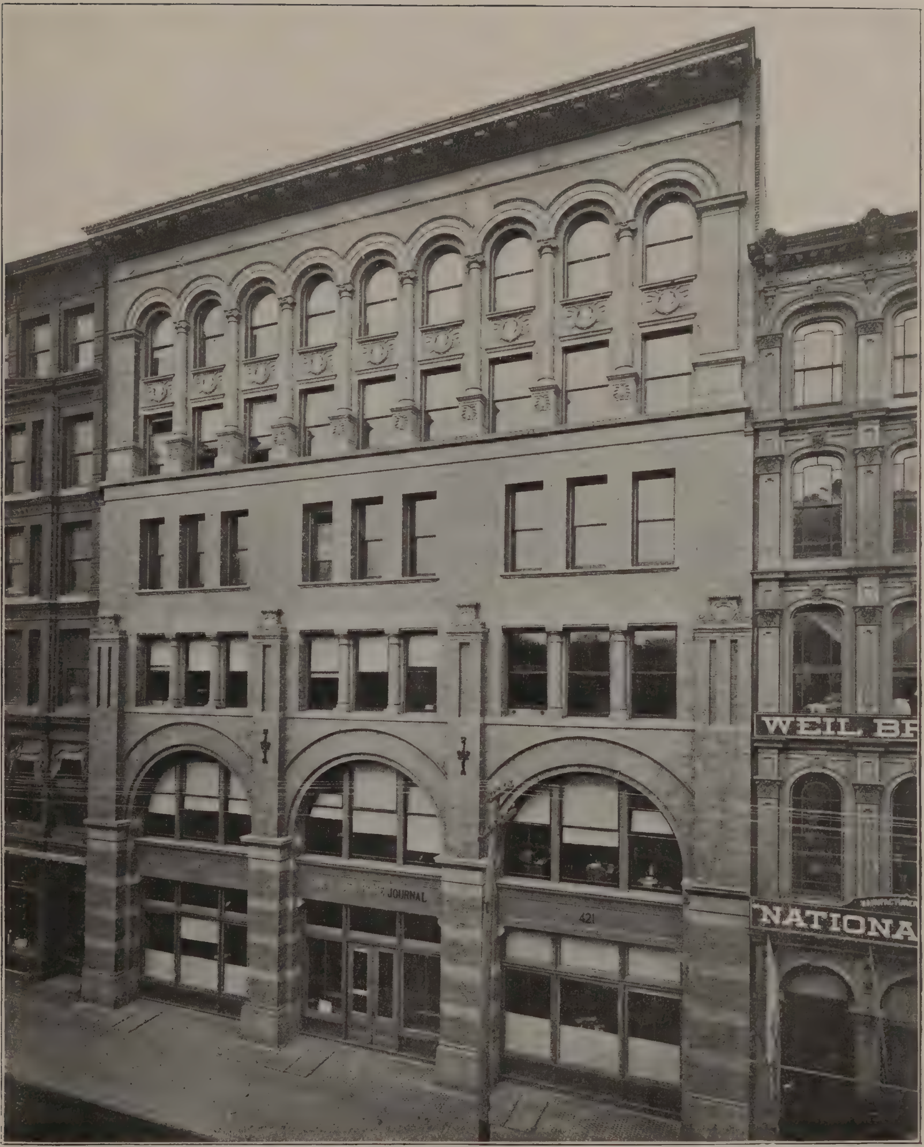
In the Waldorf the architect essayed a picturesque composition, in which symmetry is abandoned in favor of the predominance of the huge mass at the corner to which the wing of the street front is distinctly subordinated, and from which it is detached by the recessed centre. From



BOSTON PUBLIC LIBRARY

WAREHOUSE (1894).

West 23d St., New York City. Henry J. Hardenbergh, Architect.



WAREHOUSE (1893)

BOSTON PUBLIC LIBRARY

Arch St., Philadelphia, Pa.

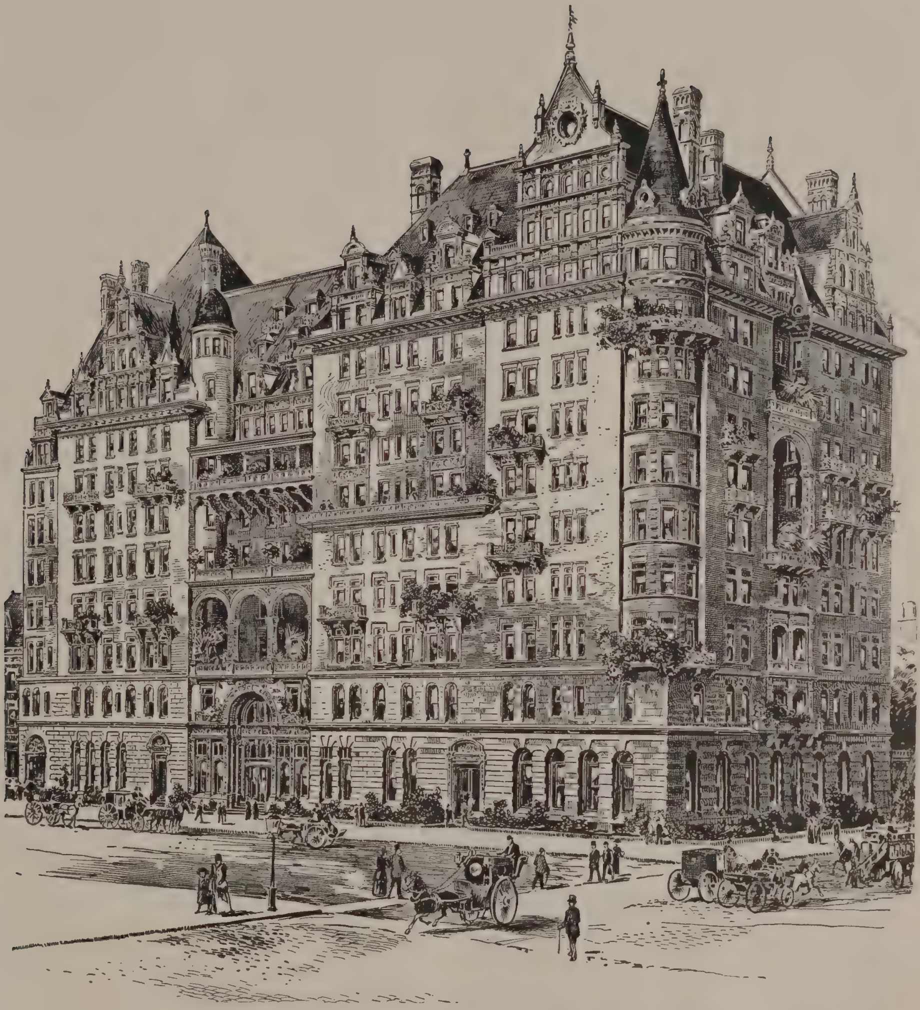
Henry J. Hardenbergh, Architect.

the assumed point of view, the point of view from which the illustration is taken, this disposition is not without its effectiveness, but it has the drawback of sacrificing the elevations, or at least the longer elevation, to the perspective. By consequence the Thirty-third street front comes to lack coherence and unity, and is not in itself an architectural composition, nor has it become more nearly a composition by the extension of it to the westward since the hotel was built. The interest of it is in the parts, which do not constitute a whole. This interest, however, is very considerable. The central feature, the recess with its loggie and its turret, is a picturesque and attractive design, in which some Italian detail does not interfere with the general expression of homeliness and quaintness which characterizes the German Renaissance, and which is enhanced by the treatment of the roofs. Above the cornice-lines, indeed, the design is almost unfailingly successful. The subdivision of the taller eastern wall into two fronts is less successful, and is confused and weakened by the fact that the pier by which the division is marked stands upon a void, the entrance, which is the largest opening in the front. On the other hand, the roof-treatment is equally distinguishing and fortunate. To set the gabled front of a three-story North German dwelling bodily above the cornice of a huge nine-story schloss by way of dormer was a bold device quite justified by its results. The avenue front is, as a whole, much more successful than the street front, having a general symmetry that is not impaired but only made piquant by the differences entailed by the occurrence of the turret at one side balancing a flank of plain wall at the other. This front has a stateliness with its picturesqueness that makes it impressive even now that its importance has been diminished by its huge overtopping neighbor.

It was in the interior of the Waldorf that its architect rendered a very considerable public service which, although we are dealing only with exterior architecture, it would not be fair to pass over. The architect's own work in the interior of the Waldorf is as noteworthy as anything in its exterior. The open court at the centre and its dependencies are among the most artistic examples of his design and of high interest. But the uniqueness of the interior is that in it, for almost the first time, a systematic attempt was made to secure in a hotel decoration that had a more artistic value and a more serious purport than the journeywork which it had been the rule to employ. The value of such an attempt is not to be measured by the actual success of the experiment, so it be successful enough to be encouraging. Of this there is no question in the Waldorf, which shows some instances, and very notably the café, or more properly the "weinstube," in which the indications of the architecture are skilfully and appreciatively carried out in the decoration. Nowhere else perhaps is the success quite so complete, and there may be even instances in which the work of an easel-painter suddenly summoned to do decoration shows an amateurish quality that makes the beholder regret the absence of the less sensitive journeyman who had learned his trade, and was aware of its conventions.

The Manhattan has much less architectural pretension than the Waldorf. It is in fact the conventional skyscraper, as straightforwardly treated as is possible for the masonry veneer of a concealed metallic construction, and it conforms to the accepted division. A three-story base, itself subdivided, sustains a shaft of nine stories and a roof division of two. It is well adjusted in proportion and in scale, but offers no salient points for comment. In the interior, however, the designer has repeated the experiment of the Waldorf, and has secured the aid of competent hands in the broad symbolical frieze of the entrance hall, in the frieze of the café, and in the successfully sumptuous dining-room.

We may hope to see these experiments carried further and to a still



HOTEL WALDORF.

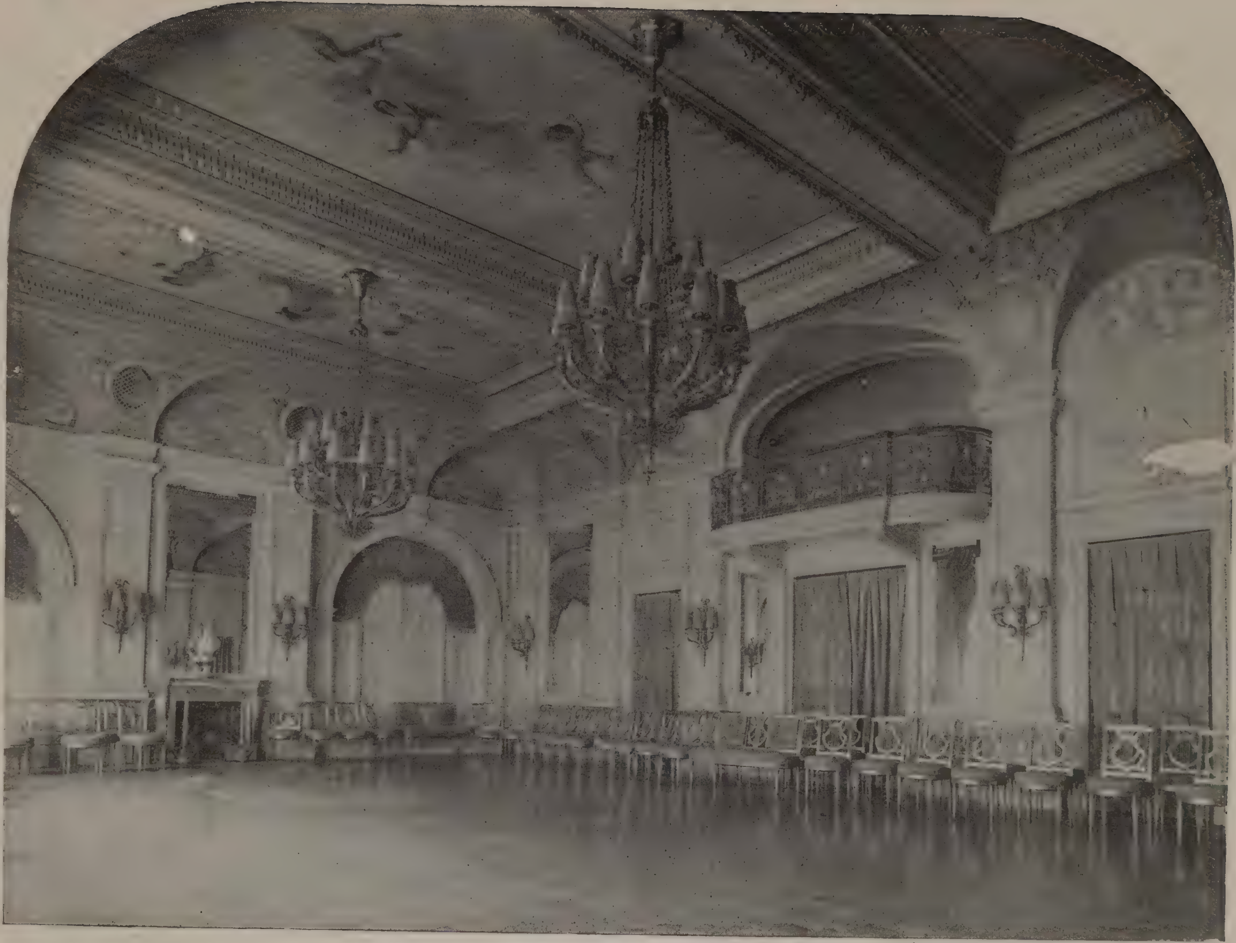
BOSTON PUBLIC LIBRARY.

Fifth Ave. and 33d St., New York City. Henry J. Hardenbergh, Architect.

BOSTON PUBLIC LIBRARY.

IN THE WALDORF HOTEL.

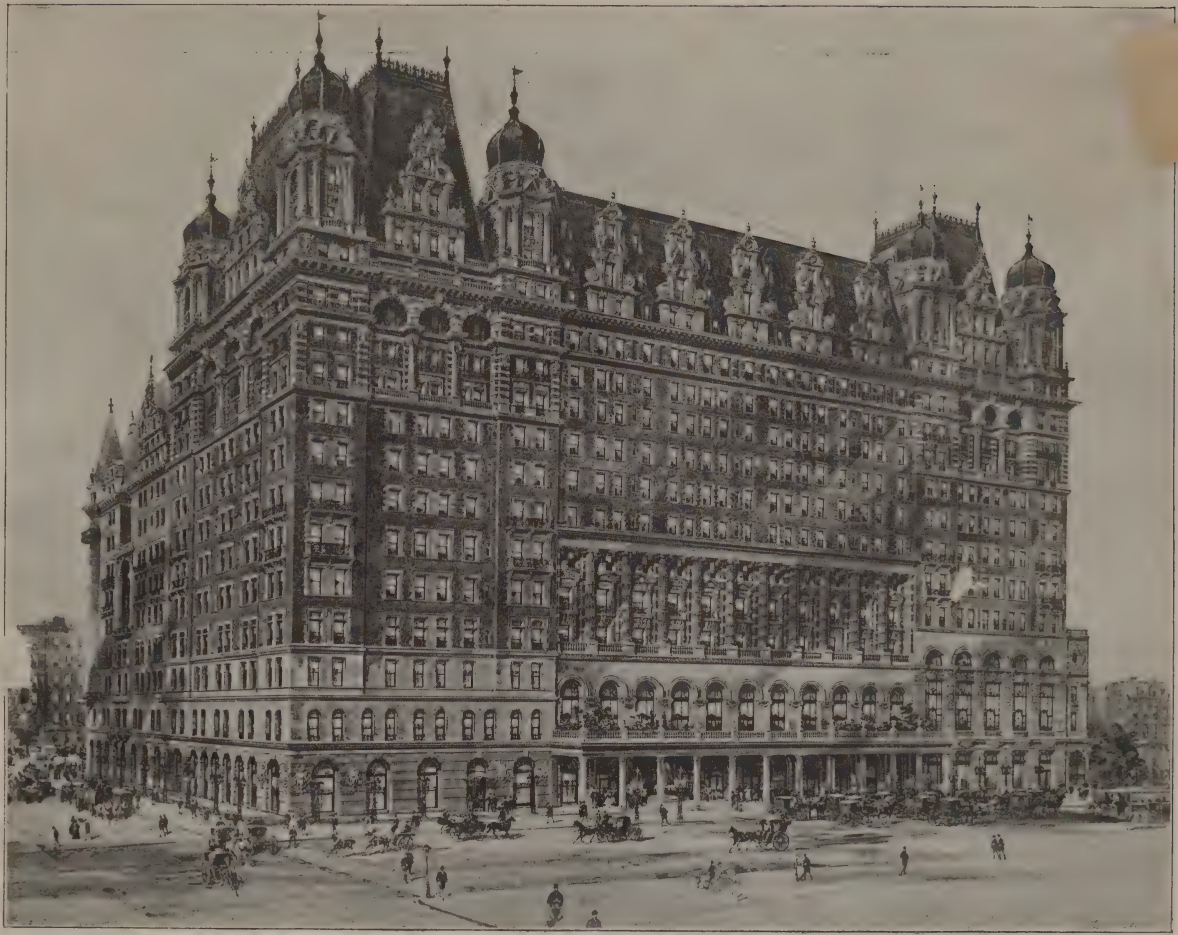
VIEW IN DINING-ROOM, WALDORF HOTEL.



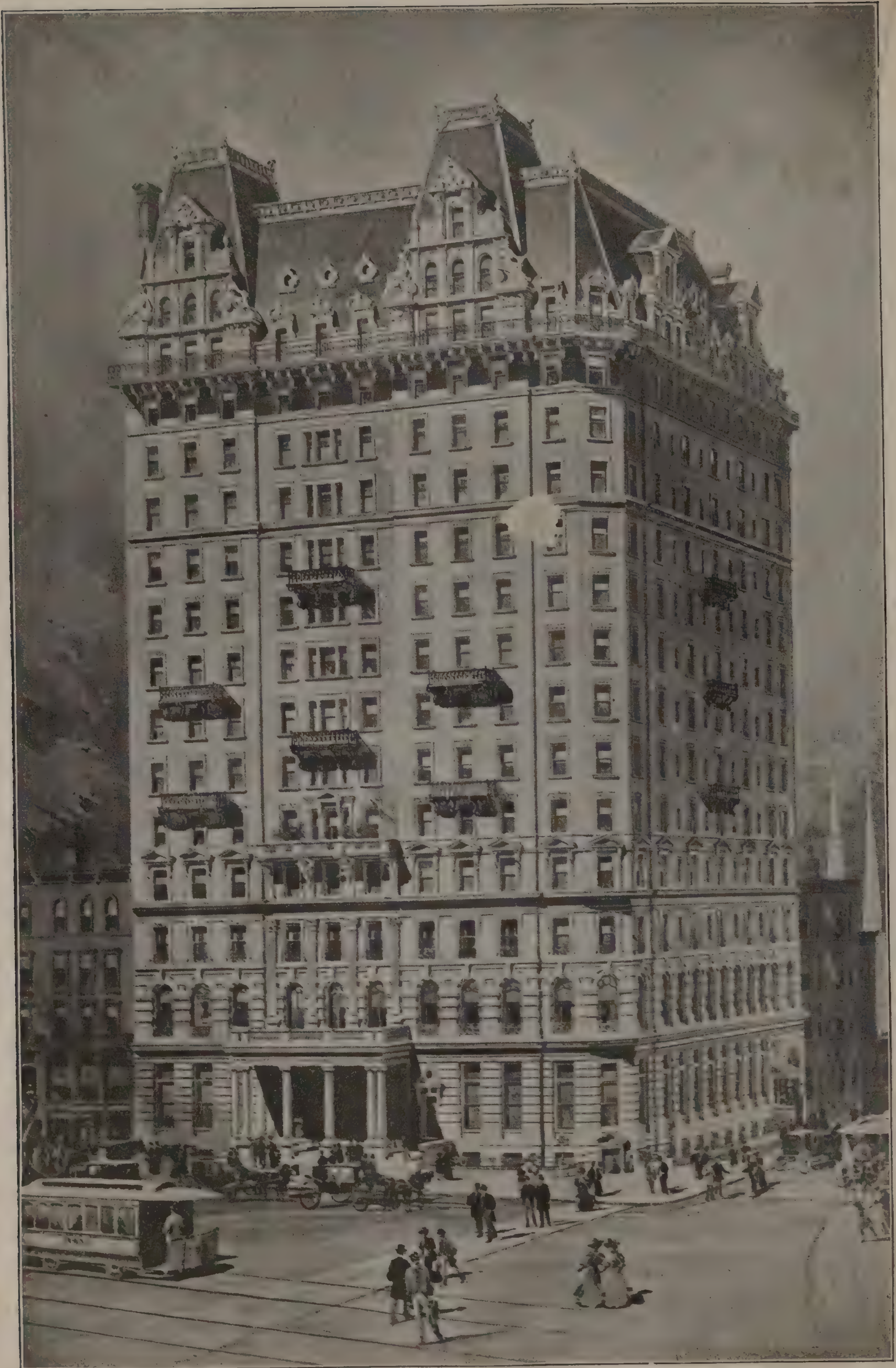
THE NEW BALL-ROOM, WALDORF HOTEL.

DETAIL IN CAFE, WALDORF HOTEL.

more conclusive success in the new hotel that adjoins the Astor and that, even in the incompleteness it exhibits at this time of writing, challenges the comment of the wayfaring man. It is quite impossible to ignore it, and, indeed, even in these days, its bigness is overpowering. Luckily it is bigness, and not an exaggeration of one dimension. On the avenue the narrower front may be nearly twice as high as it is wide, taken by itself. But it is so far incorporated with the Waldorf by a common base and a common cornice-line that the whole block-front helps to sustain its height, while upon the street front the lateral extent is ample even for fourteen stories. The attempt at picturesque irregularity of outline, which in the Waldorf was made with but partial success, has in the larger and later structure been frankly abandoned in favor of a formal symmetry. Each front makes the impression of symmetry in spite of the indication at one end of a huge feature including three stories, which has no counterpart at the other [illegible] This long front cannot fail to make an impression, though there is much variety in the impression it makes. I find it extremely successful. In spite of the formality of the general composition, the impression is of an exuberant picturesqueness, such as we find in the full blown Renaissance of North Germany and the Low countries. Though the detail is classic nothing could be further from the spirit of classic architecture than the aspect of the front. The three-story order of the centre shows the Teutonization of Hellenic forms which characterizes the whole performance. It is not so irresponsible, however, as the extreme German examples, as the Zwinger palace at Dresden. The later designer is restrained from the extravagances of the earlier by an abiding sense of structural significance which prevents him from doing what has no meaning, as well as by the tact that is most of all needed where a designer is not restrained by his "style." The essential motive of the new building may perhaps be found in the necessity for some conspicuous feature to differentiate the building from its lower neighbor above the cornice line, below which it conforms to that, but above which it cannot conform. Such a feature is supplied in the tall triple arcade, which, repeated on the adjoining side, becomes the feature of the terminal pavilion and repeated at the other end frames the front. Of the crowning of these features it doth not yet appear, except from the drawings, what



Fifth Ave. and 34th St., New York City. THE NEW ASTOR HOTEL (Now Building). Henry J. Hardenbergh, Architect.

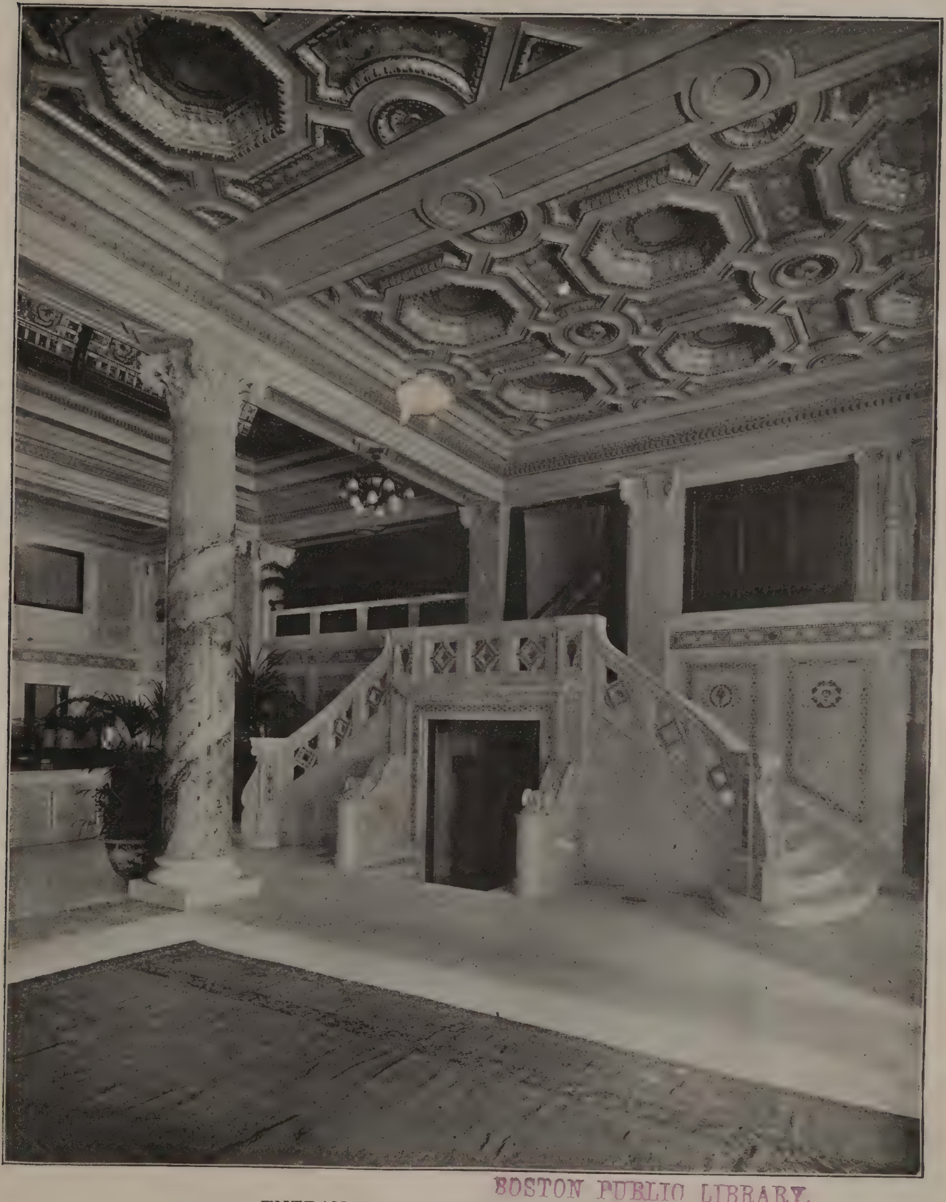


BOSTON PUBLIC LIBRARY

MANHATTAN HOTEL (1896).

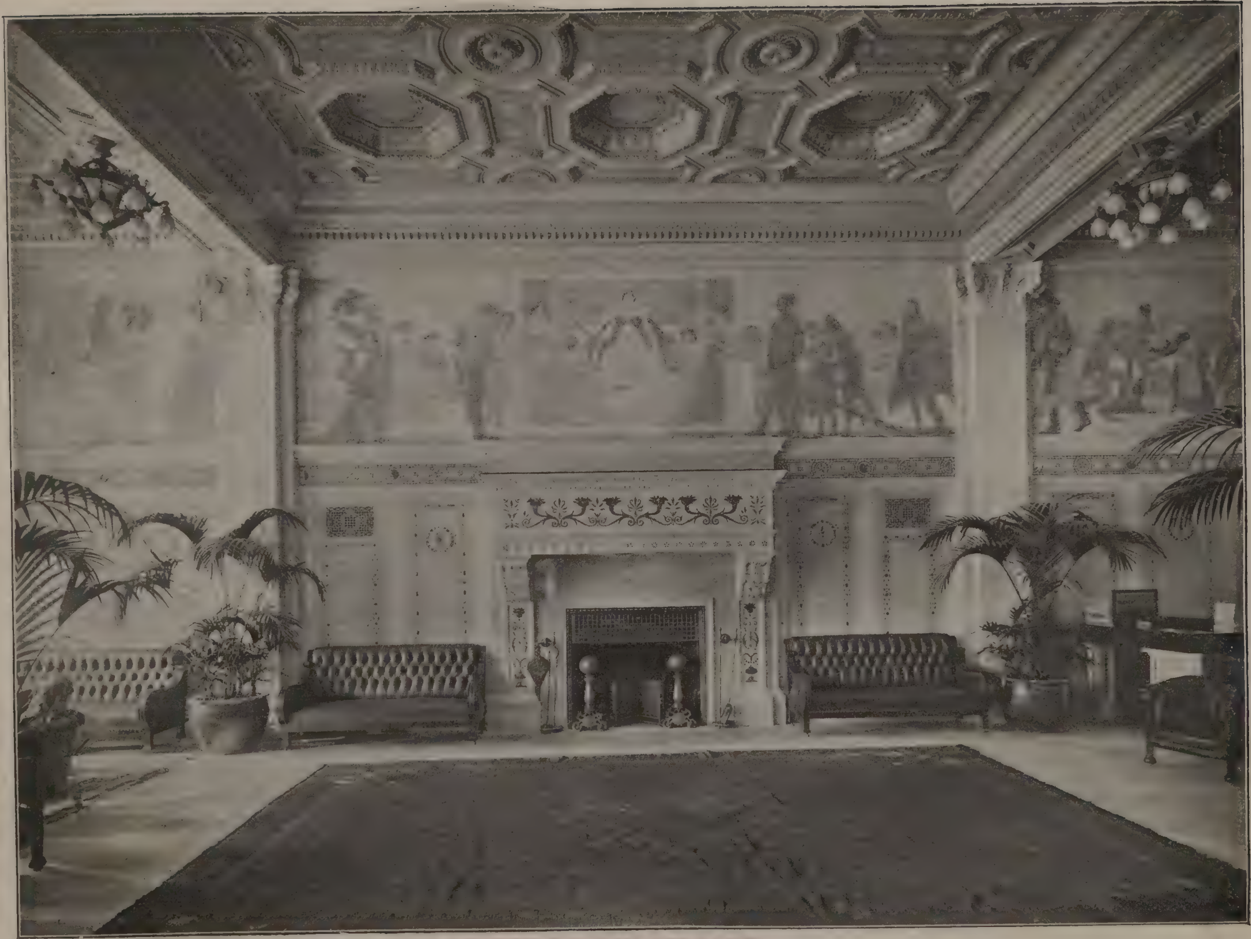
42d St. and Madison Ave., New York City.

Henry J. Hardenbergh, Architect.



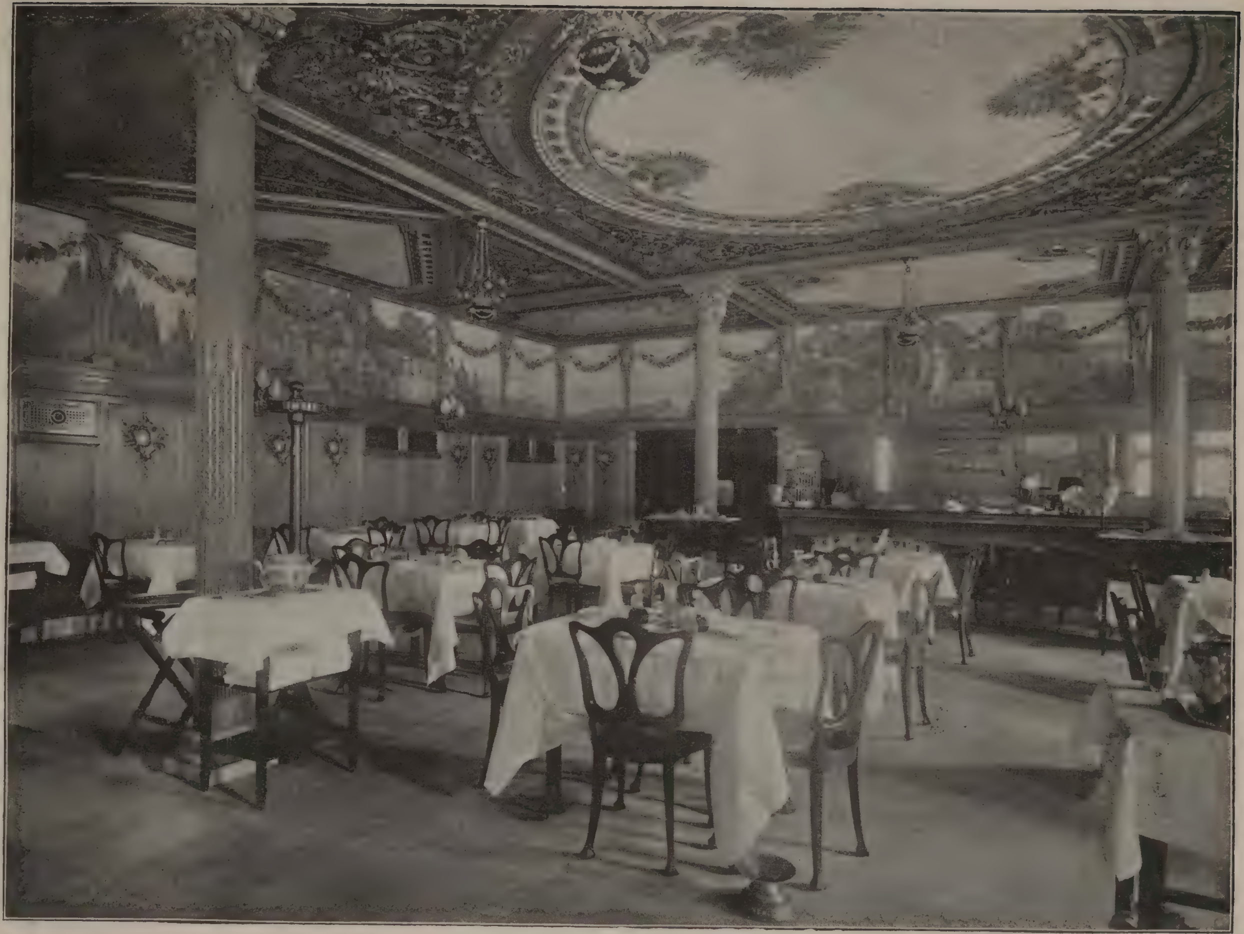
BOSTON PUBLIC LIBRARY.

ENTRANCE HALL, MANHATTAN HOTEL.



BOSTON PUBLIC LIBRARY.

IN THE ENTRANCE HALL, MANHATTAN HOTEL.



IN THE MANHATTAN HOTEL.

BOSTON PUBLIC LIBRARY.

BOSTON PUBLIC LIBRARY

THE DINING-ROOM, MANHATTAN HOTEL.

it shall be, but these indicate that the roof will be much the most exuberant part of the design. The wall between these features is properly kept as plain as possible, the central feature, the arcade with the colonnade beneath and above, being confined to the lower division, which in turn is flanked by walls as simply treated as may be. The result of these dispositions is a front undeniably pompous and even swaggering, which yet has an aspect of homeliness and quaintness that is very taking. If what remains to be done carries out the promise of what has been done already, the success of a daring essay will be secure.

It is worth while pointing out that the success of this work, in which liberty of design goes at least to the verge of license, could not have been attained except by a designer trained in much severer tasks, that the magnified detail, and the intentionally baroque crowning features, would have been offensive if the solidity and repose and balance of the structure they crown had not been already assured. It is only the disciplined designer who can allow himself these perilous freedoms.

One can fancy, with shudderings, what an undisciplined designer would have made of this scheme. Perhaps it was John Root's recognition, in the "eclectic" work of a fellow-architect, of the advantage of substituting self-restraint for the artificial regulation of the styles, an advantage to which his own work bore striking witness, that accounted for the hearty admiration of Mr. Hardenbergh's I have heard him express. At any rate one may say of Mr. Hardenbergh's successes that they attest in a peculiarly high degree the value of restraint and discipline. Some of his earlier work we have found lacking in animation, but that is evidently a "good fault" in work which in spite of it manifests individuality and compels interest. It is the solicitude to be on the safe side which has enabled him to carry off with success enterprises which were so venturesome as to involve a distinct risk of failure, such as the design of the Wolfe building, and, so far as we can judge it now, of the new Astor hotel. In Mr. Hardenbergh's work the evidences of an individual talent are accompanied by the evidences of tact and measure and discretion; and his most characteristic work is on this account as exemplary as it is interesting.

Montgomery Schuyler.

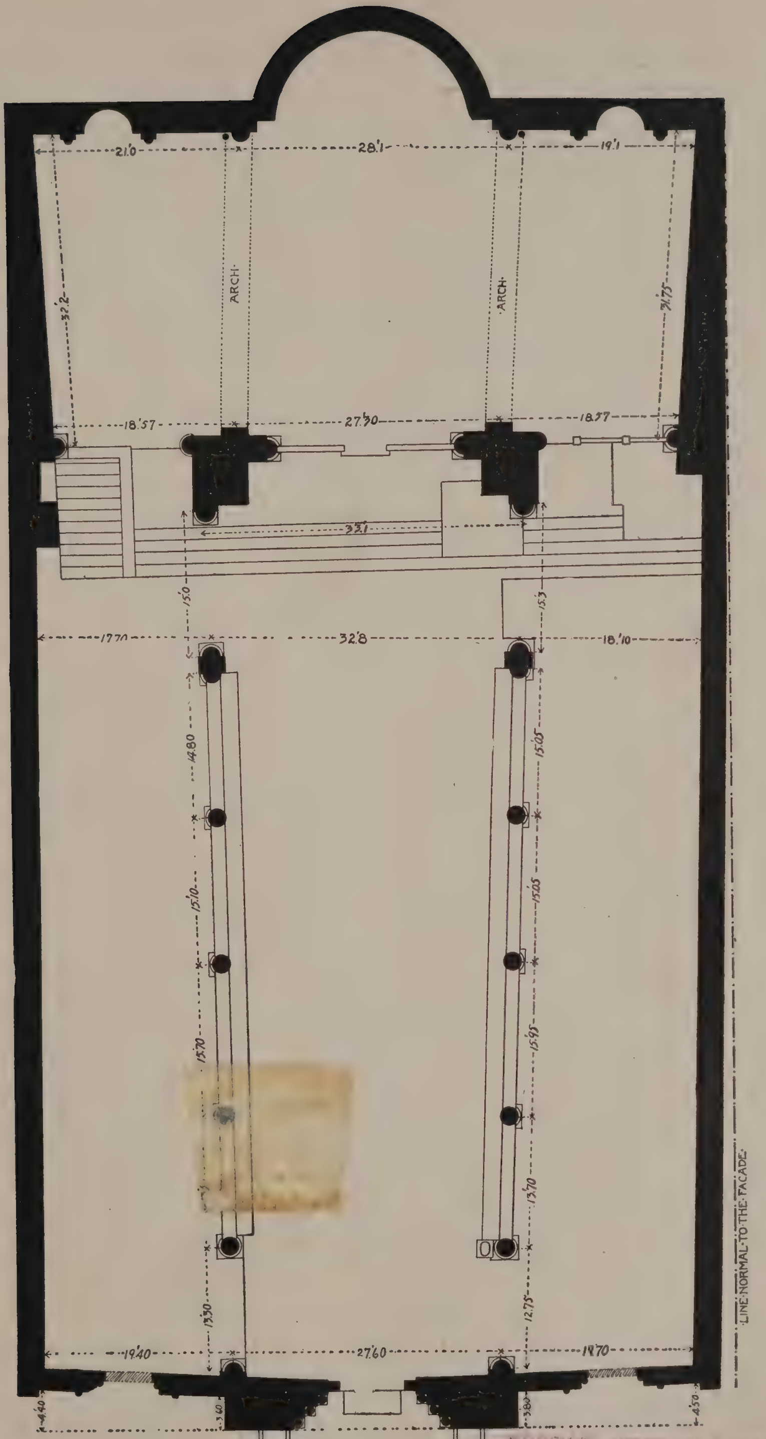
CONSTRUCTIVE ASYMMETRY IN MEDIEVAL ITALIAN CHURCHES.

IN a preliminary Paper on "Optical Refinements in Medieval Architecture" (Vol. VI., No. 1, of The Architectural Record), announcement was made of a series of observations in Medieval Italian churches, which it is the purpose of the following Papers to treat in more extended detail. These observations have been classified under the heads of "Perspective Illusions" (in the last issue); "Constructive Asymmetry" (the present issue); "Horizontal Curves;" and "Vertical Curves and Vertical Leans." Both of these last two topics, assigned to future Papers, may be regarded as phases of constructive asymmetry, but in the present Paper this subject has been confined to the cases of constructed asymmetry in the dimensions of arcades and arches, in oblique horizontal lines and in ground-plans.

As an introduction to this topic, a few words are in place about those irregularities of Italian medieval architecture, which are the result of rough and careless building and of the use of heterogeneous materials from ancient ruins.

In the first centuries of church architecture the Pagan Roman buildings were the quarries of church building material, and their remains were often recombined in the most expeditious and consequently hap-hazard fashion. In many early basilicas, columns of all sorts and sizes are fitted with capitals which were not made for them. Even if new capitals were made, they were frequently not calculated for the diameter of the columns on which they were placed. The basilica of S. Lorenzo, at Rome, offers an illustration of the rough fitting together of blocks of ancient architraves, borrowed from various sources. The church of S. Giorgio in Velabro, at Rome, will also illustrate the hap-hazard use of ancient columns and capitals. In churches of this class, we must allow a wide latitude for variety of dimension, as due to carelessness or haste, or to the re-use of old heterogeneous material. In such buildings the evidence for constructed asymmetry must lie in some scheme of arrangement whose features forbid the hypothesis of accident. For instance, it is wholly improbable that both aisles and also the nave of S. Giorgio in Velabro should all narrow in one direction by chance, to the total sum of about 18 feet (see Fig. 21 in the preceding Paper). That the given device is the same as that found in a series of other cases is also a contributory proof of design. In this church, however, the construction is so rough that we could not argue constructive asymmetry from the irregular dimensions of arches or intercolumnar spacings, because the evidence of intention gathered from the comparison of measures in the intercolumniations is of doubtful character.

There is, however, evidence of constructive intention in the columnar arrangements of S. Saba at Rome, where the building material and building methods are equally rough. The columns are arranged on both sides in a curved line, dropping heavily on both sides toward the choir. (See Fig. 23 of the last Paper). An arrangement of columns of irregular heights in such a way as to make a pronounced curve in elevation could not be due to chance, especially when found on both sides of the church, and when so arranged as not only



BOSTON PUBLIC LIBRARY

Fig. 1.—PLAN OF S. PIETRO, TOSCANELLA.

to offset a constructed rise of the pavement, but also to exaggerate the resulting convergence of lines.

That this constructed convergence of lines is found in many well-built churches is also contributory proof of purpose.

In like manner the columns used in the church of S. Maria Ara Coeli at Rome are of irregular sizes, but the fact that they are arranged on a pavement sloping upward toward the choir (with a pitch of over 3 feet for the whole length of the church) in such a way as to allow the construction of horizontal lines of arches, is a clear proof of constructive intention (see Fig. 22 of the last Paper).

These cases, from a class already disposed of, show that proofs of intention in the matter of irregular building can be offered from churches whose building materials are heterogeneous and roughly put together. The position of modern criticism has been, so far, wholly adverse to the possibility of optical refinements having been employed in medieval work; first, because obviously rough work in the construction of certain churches in certain particulars (due mainly to the use of borrowed materials) has been presumed to indicate indifference to optical effects in other particulars in the given churches; second, because obviously rough work in certain churches has been assumed to explain all cases of irregularity of construction in other churches, in which, as a matter of fact, the masonry indicates careful construction, and in which, as a matter of fact, the measurements prove careful construction.

As to the presumption that the use of heterogeneous materials implies indifference to appearances or to artistic effects, we may take a case from S. Pietro, at Toscanella, which has no reference to the perspective illusions discussed in our last Paper.

Some of the capitals in this church are antique and some are medieval and all are of irregular size and varying design, but it is perfectly certain that there was purpose in an arrangement which placed these capitals in corresponding pairs on the sides of the nave so that two Ionic capitals, two Corinthian capitals, and two medieval capitals, of similar, though not identical design, are brought to face one another. From this example, it appears again that irregularity of one sort does not negative purpose of another sort. Carelessness as to correspondence of details in one point—say in exact similarity of design—does not argue carelessness as to arrangement. To put it in another way, artistic preference for variety of details is not carelessness at all. There were many different standards of masonry refinement and of accuracy in measurement in medieval buildings, some due to period, some due to locality, some due to wealth or poverty, and some due to the personal influence or character of the individual builder. The most important element of the problem is the presence or absence of Byzantine subtlety. Byzantine design is the most systematically irregular and the least obtrusively so. All these things must be considered, and must be considered afresh in face of each individual building, when we speak of medieval irregularities, never forgetting that there was in many medieval buildings—however great the refinement of masonry and detail—a grand and artistic indifference to regularity, considered as an ideal or standard of perfection, which will explain a great many facts.

Modern students have so far overlooked or neglected an enormous number of facts which are not very easily collated or collected. Then they have jumbled together in their conception of medieval building three different phases of irregularity, viz.: first, rough work and the use of heterogeneous material from older buildings; second, irregularities which are part of schematic arrangements; and third, intentional irregularities without schematic arrangements. If we take the standpoint of the medieval builder

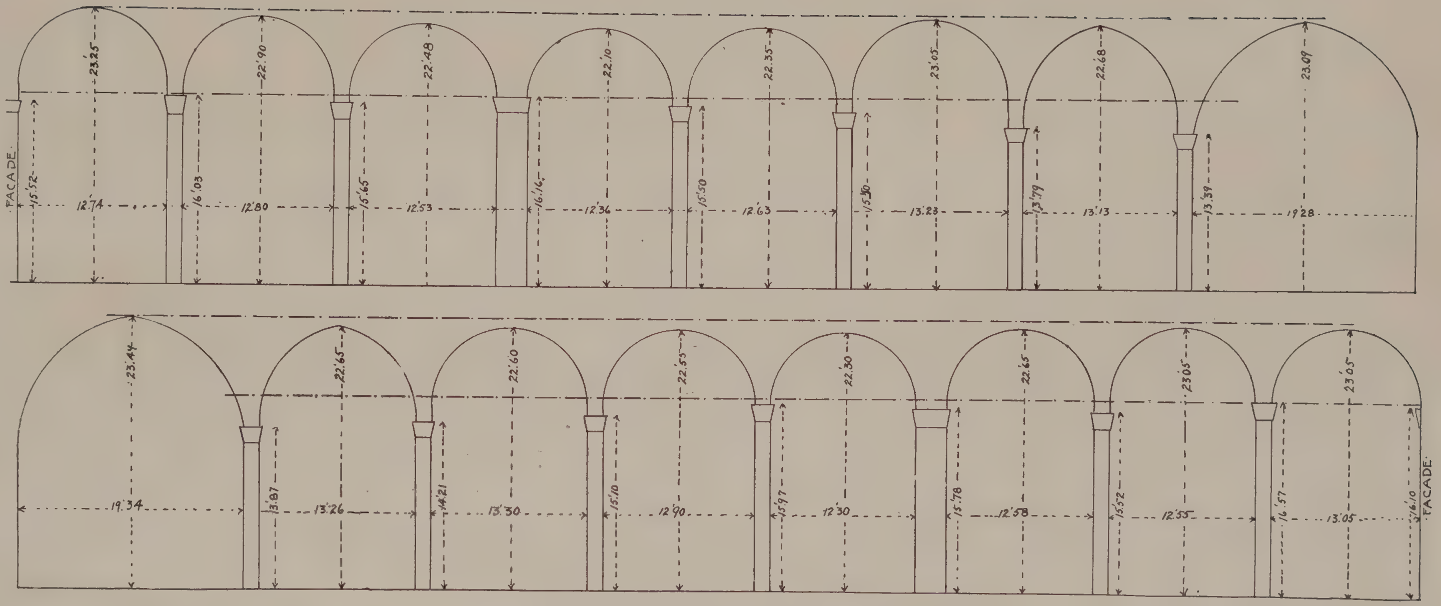


Fig. 2.—SECTIONS OF S. MICHELE AI SCALZI, PISA.

In the last three bays preceding the choir the capitals drop 2, 11 (left), and 2, 10 right, (feet and decimals). The widest span represents the choir.

himself, we shall find no inconsistency between indifference to regularity in one place and purposely constructed irregularity in another. For his make-up both these attitudes were interchangeable and matter-of-course.

Indifference, or careless building, or the use of heterogeneous materials cannot be called up as explanations when we are dealing with measurements, which show the existence of a scheme. The perspective deceptions so far quoted, in the preceding issue, bear, on the face of things, that evidence of design which is furnished by a scheme, i. e., by an arrangement of measurements which the law of chances would lead us to suppose could not be accidental in one case and which certainly could not be accidental when found in a series of repetitions. But evasions of regularity were also practiced from a definite artistic feeling and purpose and generally without the design of obtaining an effect of dimension by palpable trickery. Here is an illustration from the basilica at Palaja. (Palaja is reached by carriage from Pontedera, which is on the railroad between Florence and Pisa.) The measures for the interior pier spacings in metres and centimetres on one side of this church, beginning at the entrance and moving toward the choir, are as follows:

4.92; 4.87; 5.11; 4.86; 4.92.

These measures were taken hastily, and yet the first bay and the last bay tally exactly; the measurements next adjacent tally within a centimetre. The middle bay is largest by twenty-four centimetres, or say ten inches. We will not debate the purpose at present. The proof offered is the proof of intention. Where is the objector who will say that the larger arch is due to careless building, when the measures tally within a centimetre for the corresponding pairs on either side of it?

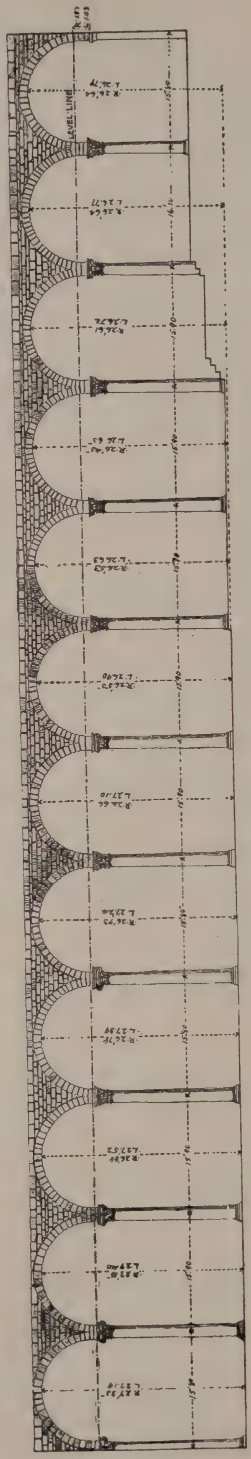


Fig. 3.—SECTION OF SAN FREDIANO, LUCCA.

The arches and capitals drop toward the choir on both sides. The pavement steps up, at three different points, in the same direction. The intercolumniations show accurate building in most of the bays to 1-10 of a foot. The extreme limit of error is 3-10 of a foot.

Another illustration may be taken from San Pietro, at Toscanella, just quoted for the case of its capitals (Fig. 1). The measures are given in feet

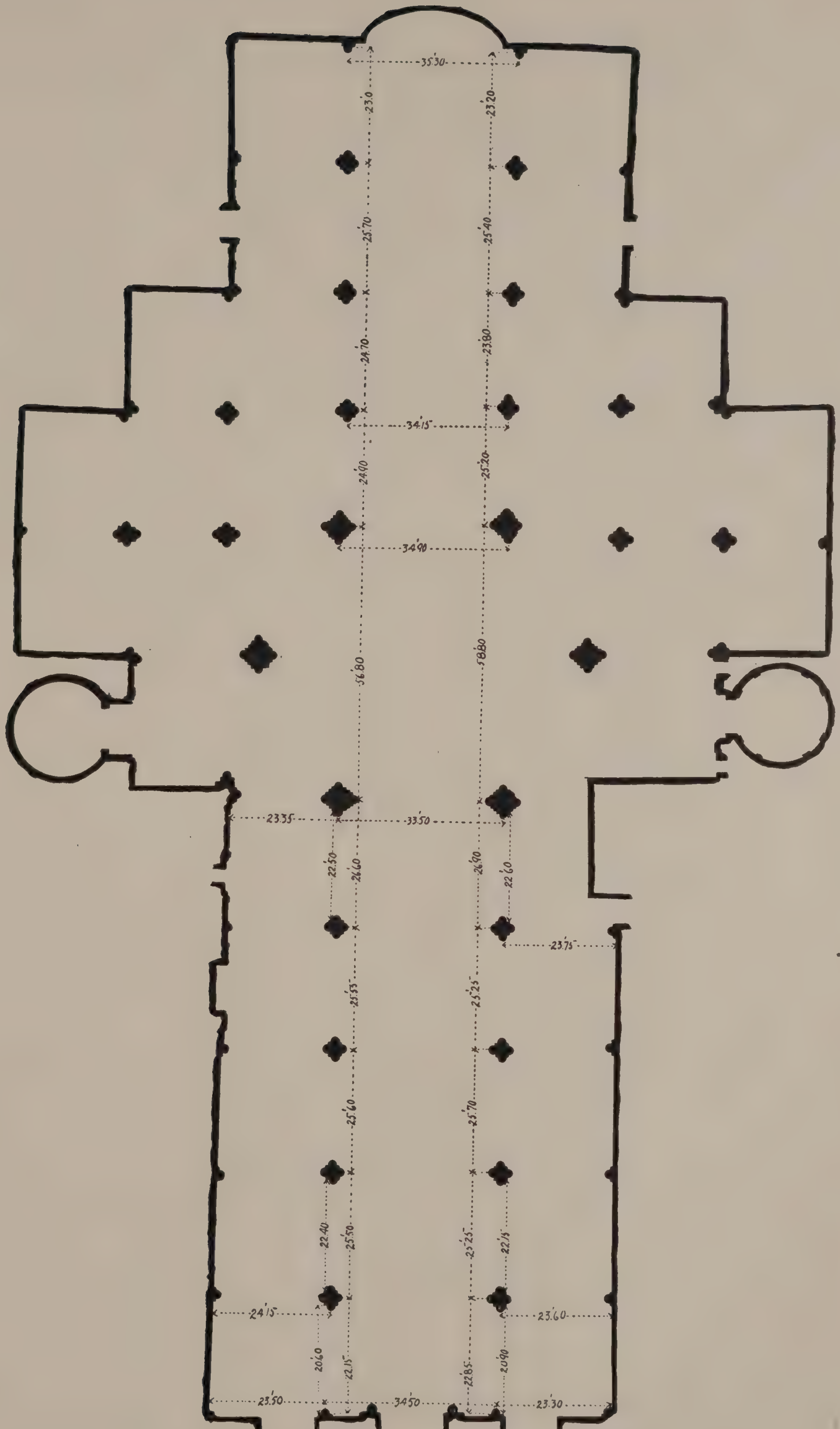


Fig. 4.—PLAN OF THE SIENA CATHEDRAL.

and decimals and represent the pier spacings, beginning at the entrance:

Left, 13.30; 13.55; 15.70; 15.10; 14.80; 15.

Right, 12.75; 13.70; 15.95; 15.05; 15.05; 15.30.

On both sides the second span is larger than the first; on both sides the third span is larger than the second; on both sides the fourth span is narrower than the third; on both sides the sixth span is wider than the fifth. These correspondences cannot be accidental.

The proofs that Italian builders constructed irregular designs with malice aforethought can be multiplied indefinitely when detail measurements are taken and compared. Another proof is offered from the survey of San Michele ai Scalzi, at Pisa. The reader is asked to consult the measurements of the sections (Fig. 2), noting the following facts. The columns and capitals are taken from ancient buildings and are so heterogeneous that many variations of dimension will be due to the irregularity of materials used. We next notice that the largest arch defines the span needed for the dimensions of the choir. The arches drop toward the choir, but so slightly that the intermediate irregularities and breaks in the scheme would forbid the drawing of conclusions from this one fact. The columns are, however, selected in such a way that the capitals drop between two and three feet on both sides of the church in the last three bays toward the choir. This arrangement of capitals has so many parallels that it is certainly a perspective device. The minor variations of measurement speak for themselves. The measures for the arcades of the exterior façade are here given in metres (whereas the interior survey measures are in feet and decimals):

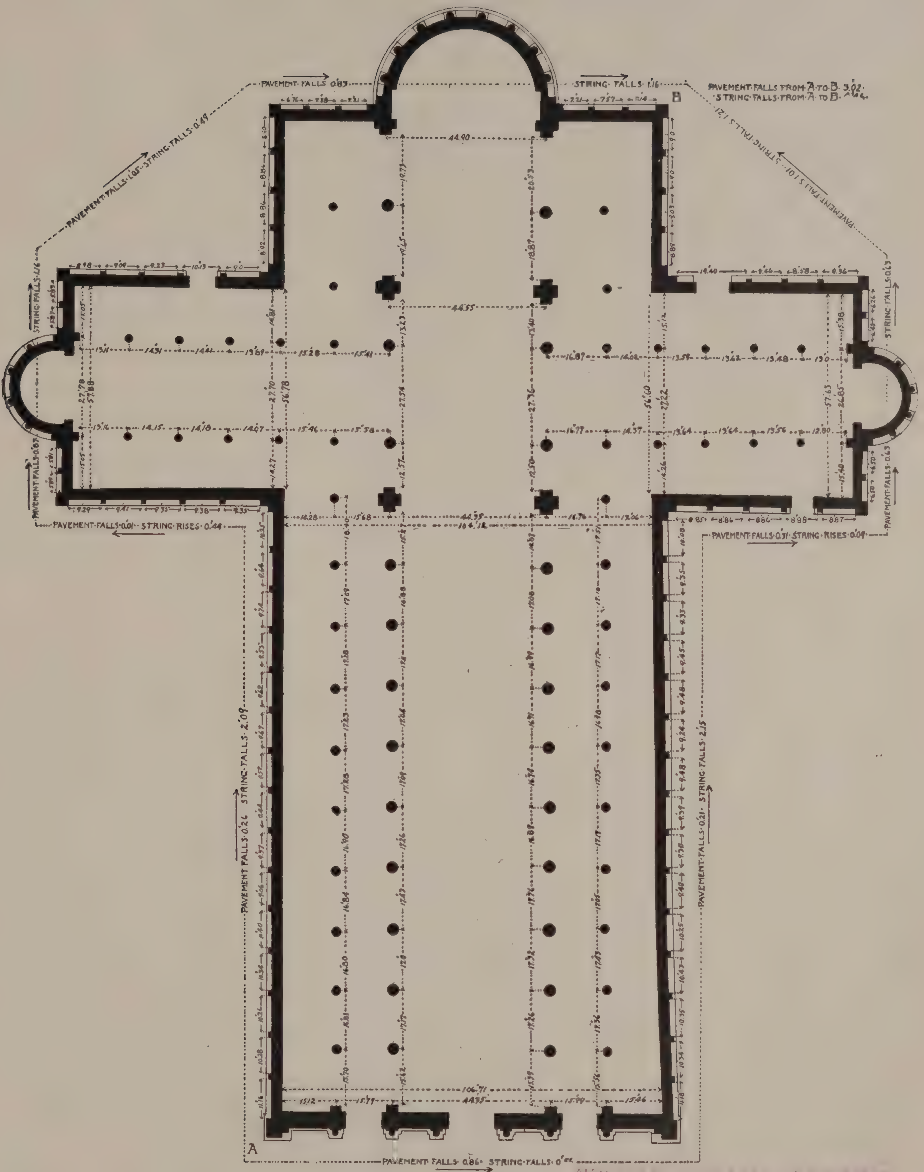
2.27; 2.36; 3.33; 2.36; 2.30.

The centre measure represents the arcade of the doorway. On either side of it the arcades diminish in span in corresponding gradation. These measurements prove that an allowance of three centimetres, or a little over one inch, will represent the amount of error due to carelessness in the interior, because the arcades on either side of the door correspond exactly, and the outer arcades vary in measurements only three centimetres.

Mr. Penrose has fixed the limit of error in the masonry of the Parthenon at 1-50th of an inch, by comparing the measures for the two opposite ends of the building, which tally within that limit. By similar means we may often fix the limit of error due to natural causes in a medieval building. It can be shown that three inches is a fair allowance for the irregularities due to natural causes in churches where no refinements have been detected; for instance, in the bays of the cathedrals of Milan, Bologna and Florence. This appears from a comparison of dimensions which in these churches were certainly intended to be equal.

In S. Frediano, at Lucca (Fig. 3), there is a scheme in the arches, which drop toward the choir on both sides of the church (and the pavement steps up at three different stages before the choir is reached), but in this church there is no scheme in the spacings. The measurements of intercolumnar spacing in this church, which has twelve bays, tally within 2-10 of a foot. This will be the limit of variation due to accident in this church, which is more roughly built than a great many which could be mentioned. In the cathedral of Arezzo, where the third bay is four and a-half feet narrower than the two first bays, and the sixth bay is seventeen feet narrower than the fifth, we can show that the limit of error due to accident is 2-10 of a foot. The measurements on the two sides of the church tally for every bay in the church to that degree of exactitude or inside of it. (See Fig. 13 of the last Paper.)

A comparison of measurements for the bays of the nave in the Siena Cathedral (Fig. 4) shows accurate cor-


PAVEMENT·FALLS·0.83
STRING·FALLS·1.16
PAVEMENT·FALLS·FROM·A·TO·B·3.02·
STRING·FALLS·FROM·A·TO·B·
STRING·FALLS·1.21
PAVEMENT·FALLS·1.01
PAVEMENT·FALLS·1.05·STRING·FALLS·0.69
STRING·FALLS·1.16
PAVEMENT·FALLS·0.87
PAVEMENT·FALLS·0.01·STRING·RISES·0.44
STRING·FALLS·0.63
PAVEMENT·FALLS·0.63
PAVEMENT·FALLS·0.31·STRING·RISES·0.09
PAVEMENT·FALLS·0.24 STRING·FALLS·2.09
PAVEMENT·FALLS·0.21·STRING·FALLS·2.15
PAVEMENT·FALLS·0.86·STRING·FALLS·0.82
A
B
44.90
44.55
104.12
106.71
44.95

BOSTON PUBLIC LIBRARY

Fig. 5.—PLAN OF THE PISA CATHEDRAL.
This plan includes the levels of the exterior pavement and string-courses and the curve of the south wall.

respondence within 3-10 of a foot for the second, third, fourth, and fifth pair. We are justified, therefore, in arguing purpose for discrepancies of measurement in the bays crossing the transept, which show a variation in one case of two feet. In speaking of these discrepancies Jacob Burckhardt, the greatest living authority on the subject of Italian art, says in his *Cicerone*: "Der Dom von Siena . . . empfängt den Beschauer gleich mit einer Reihe von Räthselfragen, welche der Verfasser so wenig wie die meisten Andern zu lösen im Stande ist"—"the Cathedral of Siena meets the observer with an array of riddles which the author is as little able to solve as a number of other people."

A comparison of the intercolumniations on opposite sides of the nave in S. Bartolomeo at Rome shows the extreme limit of error in that church to be 3-10 of a foot (Fig. 14).

A comparison of exterior arcade spacings in the Pisa Cathedral will prove very instructive (Fig. 5). On the west side of the south transept the measurements tally in five bays to 3-100 of a foot. On the west side of the north transept they tally to 12-100 of a foot. This gives a fair estimate for the limit of error due to accident elsewhere. Now let us take the exterior sides of the cathedral and examine the spacing of the arcades. On the south side, beginning at the façade, the first bay measures 11.18 (feet and decimals). The bays diminish with slight irregularities of intermediate measurements to 9.40 at the sixth bay. *On the opposite north side* the same bays diminish from 11.16 to 9.06. This arrangement cannot be accidental, nor can it be accidental that on the opposite sides of the church the measurements run for nine bays (including the sixth), at 9. decimal, and then rise on both sides in the last bay next the transept to 10. decimal.

As incommensurate measurements and incommensurate spacings, both with and without a scheme, are already known to be intentional in the Greek temples,* we derive a fair argument from the transept measures of the Pisa Cathedral, that any variation above 12-100 of a foot on the sides of the church is intentional.

Let us next examine the intercolumnar spacings of the nave (Fig. 5). On both sides of the nave we begin at the entrance with 15. decimal. On both sides we find at the second bay 17. decimal. On both sides we find the fourth bay to have the widest span with 17. decimal. On both sides we find the measures diminish beyond this bay. On the south side they diminish from the fourth to the ninth bay 68-100 of a foot. On the north side they diminish in the same distance 45-100 of a foot. (The comparisons for the tenth bay are best taken from the gallery levels (Figs. 6, 7), where we shall find the measures are taken between columns, whereas on the plan they are taken between centres, and the last measurement runs only to the surface of the piers.)

If we compare these intercolumniations with the heights of the arches (see gallery levels, Figs. 6, 7) we shall find them to be connected with a scheme on both sides of the nave, by which the arches drop gradually on both sides, towards the transept, but with the maximum drop lying between the fourth bay and the tenth; amounting to 1.98 on the south and 1.64 on the north. To this again corresponds on both sides a bend in the galleries, which occurs on both sides over the third column from the entrance and for which the measures are entered on the surveys. Above the gallery bends the schemes vary. In the south gallery the piers rise and then drop with the gallery and the small arcades adhere to the same scheme. On the north side the gallery piers are built to a level for the first four bays near the façade, so as to offset a rising pitch of eight inches in the cornice of the gallery on which they stand; they then drop gradually and continuously for the

---

*See "Architectural Record," Vol. IV., No. 4, "Origin of Greek Horizontal Curves."

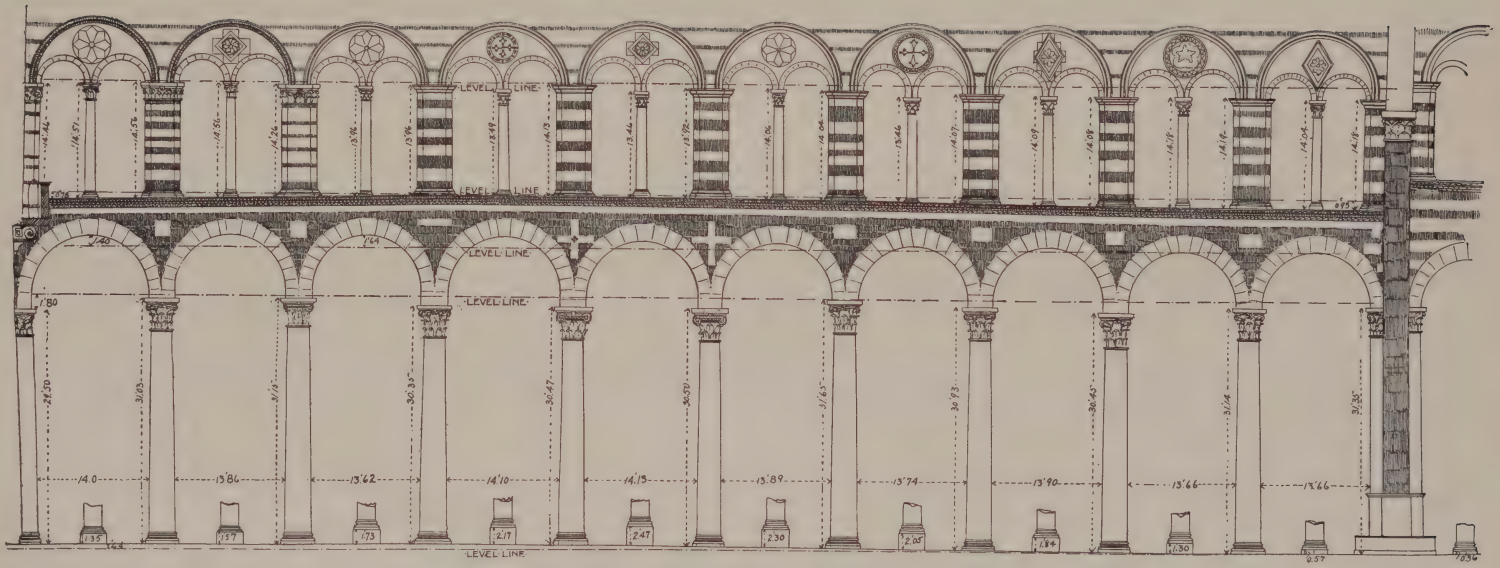


Fig. 6.—SECTION AND LEVELS OF THE NORTH GALLERY, PISA CATHEDRAL.
The transept and choir are beyond the last bay on the right.

PUBLIC LIBRARY

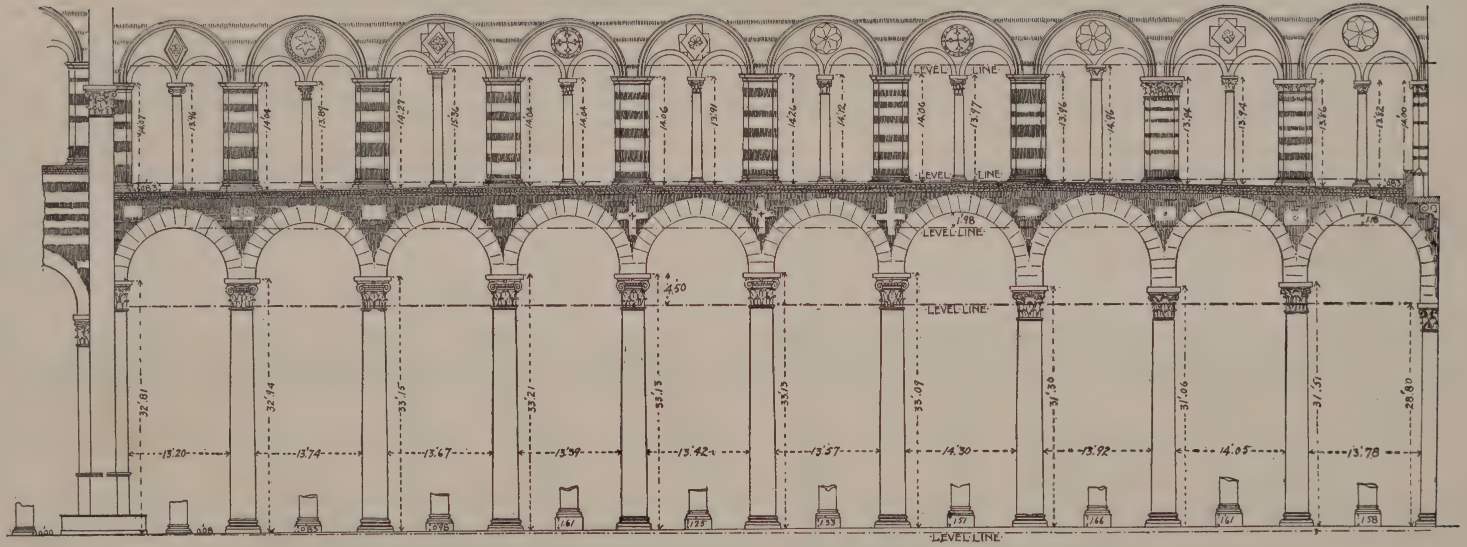


Fig. 7.—SECTION AND LEVELS OF THE SOUTH GALLERY, PISA CATHEDRAL.

The transept and choir are beyond the last bay on the left.

BOSTON PUBLIC LIBRARY.

whole distance between the fourth bay and the transept. The small arcades follow the same line, but with a more pronounced pitch. The small columns, of varying sizes, as due to their derivation from Sicilian ruins, are arranged on both sides, partly to accent and partly to break up and vary the schemes which are already sufficiently perplexing. The smaller columns on the south side are arranged to exaggerate the rise and fall of the gallery cornice; on the north side they adhere with minor variations to the pitch of the arches and piers. The perplexities and mystifications of the eye are still further increased by a wilfully broken system of masonry stripings in which no pier has a regular system of striping, either as regards itself or its neighbors (see Figs. 6, 7). (On this head it must be remembered that the regular stripes above the gallery piers, of which very little appears in these sections, are modern coloring and not ancient masonry.)

From the facts so far brought out in this part of the argument, it appears that a purpose can be proven in many irregular arrangements of the Italian Romanesque; first, by showing that correspondences of irregularity can be used as a proof of intention; second, by showing that there are means, in many cases, of fixing a limit of error due to accident; third, by urging the point that we cannot admit the purpose of definite schemes in one part of a church and assert at the same time that the builders did not know what they were doing in another part. We have, for instance, such proof of the use of the same definite schemes in both gallery levels of the Pisa Cathedral in some cases, as to indicate that a different scheme was purposely employed in each gallery in other cases.

The Pisa Cathedral is a remarkable illustration of three different phases of irregular building. Its materials are largely heterogeneous and combined with a magnificent disregard of formal correspondence. The columns of the nave, for instance, are of irregular sizes from causes wholly outside the control of the builders. On the other hand, many features of the building show definite planning for definite optical effects in a given direction, for instance, the lines of the nave arches. Experts in optics will admit that the gallery bends produce an effect of dimension in both directions. I believe that most of the irregularities were intended for effect in any and every direction; in other words, that they were intended to produce an optical mystification. This is, no doubt, contributory to an effect of increased magnitude, but there is a subtlety in the means adopted which allows us to use the term of optical refinements in speaking of them. When we come to the subject of curves in greater detail, which is already suggested by the bends of the gallery lines, we shall be able to show that optical refinements were used at Pisa and elsewhere in Italy, in the exact sense which applies to the Greek temple refinements.

It is not necessary to assert that an optical theory was present to the minds of the Italian Romanesque builders, in the matter of every intentional irregularity, but it is clear that their ideal of art was to make every part of a building interesting to the eye by giving to every part some subtle variety of form and aspect. That an optical mystification is produced by such a system of building can be argued from some of the experiences of our own survey.

In the south transept of the Pisa Cathedral the columns on the west side average two feet and a-half higher than those on the east side of the same transept. The explanation is that when we enter by the bronze doors of Bonanus, as most people do who do not enter the main door of the cathedral, we "size up" the transept columns in general by the dimensions of those that first strike the eye in their full height. The architect has put his best foot forward for a good first impression. His columns came from Sicily and were of irregular sizes, but it cannot be chance that all the big ones are on the same side of the transept and that side the one facing its entrance door. Our surveying party worked over four weeks on the Pisa Cathedral without detecting this trick. I finally discovered it by pure accident. In plumbing the columns for the amount of their leans, I employed a man to carry a pole and was much surprised to find him stretching to reach the capitals on the west side of the transept. I then noticed the discrepancy of size in the lines of columns and took the measures, with the results specified.

It is quite likely that one discrepancy of such a character would be more speedily detected and quite certain that the multitude of these devices in the Pisa Cathedral so mystifies the eye that any given one is more likely to pass undetected.

A still more interesting case is that of the south wall at Troja (Fig. 8).

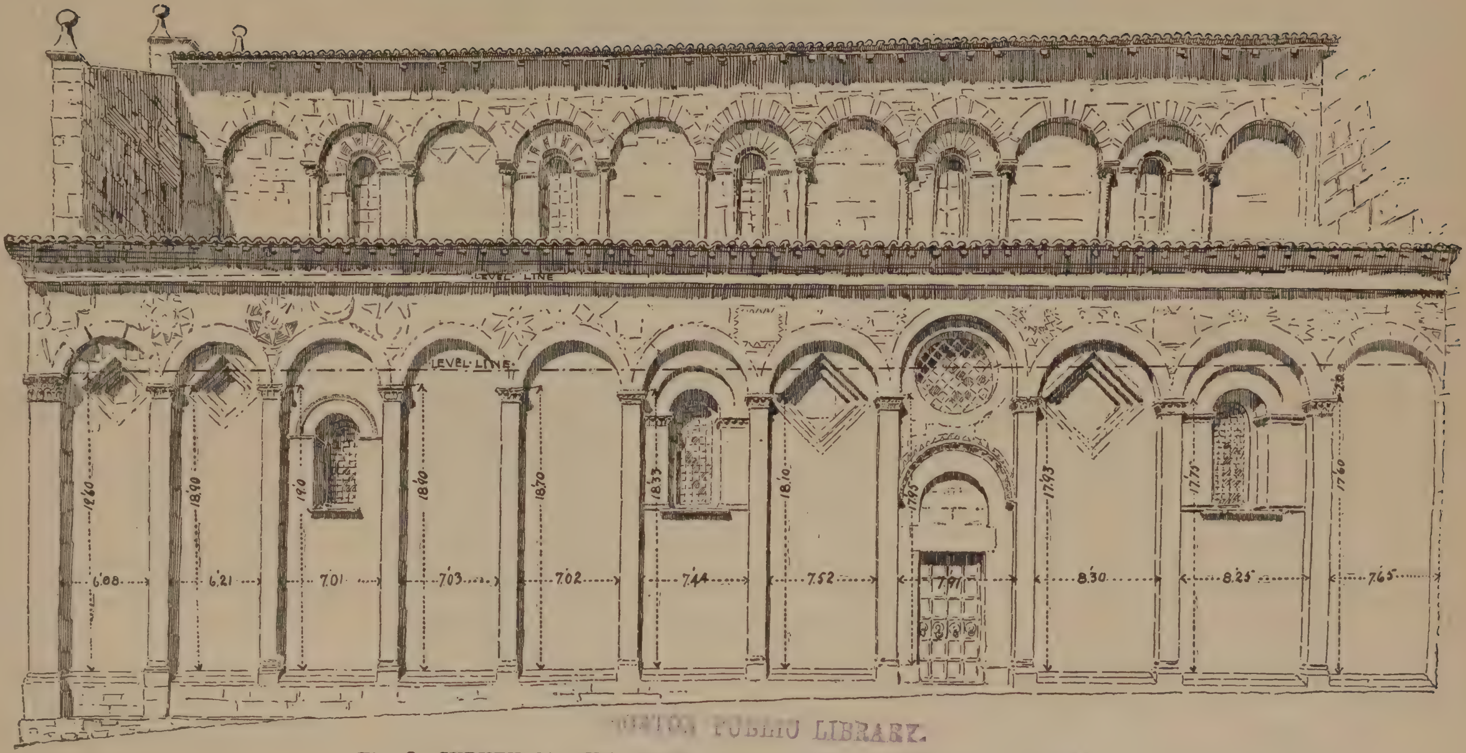
If the reader will examine this survey he will see that the arcades gradually increase in width from façade to transept, to the amount of two feet, while the pilasters gradually decrease in height in the same direction to the amount of two feet. The regularity of the variation in one given direction is such, in both cases, as to eliminate all suspicion of accident. Gentlemen who play poker are aware that a sequence of five cards does not often fall into their hands before they draw, and that it often fails them when they draw to it. Let them now consider the chances, after shuffling the ten spot cards together, of dealing them out in the regular order of number from one to ten, or in the regular order from ten to one. They will then be able to estimate the chances against accident in the *double* scheme of Troja.

From the standpoint of perspective, the effects are contradictory, but this very contradiction produces an effect of optical mystification and perplexity which must have been the result intended. This mystification is also contributory to an effect of dimension.

In this wall the plinth line is level and the cornice of the aisle roof drops a foot towards the transept. Neither Mr. McKecknie nor I noticed the variations in arch dimension and height of the capitals until the measures had been taken.

A corresponding mystification is found on the side of the cathedral of Prato (Fig. 9). As at Troja the wall arcades gradually increase in size toward the transept, and the pilasters gradually decrease in height in the same direction. The arcade spacings are given in detail on the ground-plan of Prato Cathedral (Fig. 18 of the last Paper). A summary of the measures taken is as follows: The arcade spaces widen gradually from 9.33 to 12.34 (feet and decimals), a difference of three feet. (In the following measures for heights, the constants are omitted.) The arcades rise from 3.80 to 4.20, a difference of .40. The capitals drop from 1.20 to .85, a difference of .35. As at Troja, the arcade next the transept reverses the scheme. At Prato, the arcades containing the doors also break with the scheme of spacings. (It has been shown in my last Paper that both Troja and Prato have interior schemes bearing on the effect of the choir.)

I shall ultimately give a more careful account of the reasons for believing the subtleties in question to be of Byzantine derivation. At present I wish to point out that they are by no means universal, and if it were possible to consider any one of the given cases accidental, it would then devolve on the objector to explain why our survey has not found these subtleties in the Gothic of Northern Italy, why in the Italian Gothic of Tuscany they center in the buildings which are most nearly related to the Pisan Romanesque, why in the Romanesque period the phenomena are multiplied and well defined, according to the known historic facts regarding the centres of Byzantine culture in Italy, and why they appear to radiate from these Byzantine centres with weakening intensity according to the amount of distance and



BOSTON PUBLIC LIBRARY.

Fig. 8.—SURVEY OF THE SOUTH SIDE OF THE CATHEDRAL OF TROJA.

according to the Byzantine influence apparent in decorative details. It will also devolve on the objector to explain why in the Byzantine centres of Italian culture the phenomena are most numerous and best defined in the richer and important churches, and why they tend to disappear in the humbler and more rudely built churches, in which latter class accidental irregularities would naturally be most common, according to the present prevailing prejudice.

It has been shown in the last Paper that obliquities in presumably horizontal lines of architectural members were employed in interiors for purposes of direct perspective effect in one given direction, but it appears from the instances at Prato and Troja that they were also employed as a means of optical mystification in exteriors. A remarkable instance of this use is offered by the north side of S. Paolo Ripa d'Arno at Pisa (Fig. 10). The south side of this church is of rough masonry and unfinished as regards the casing.

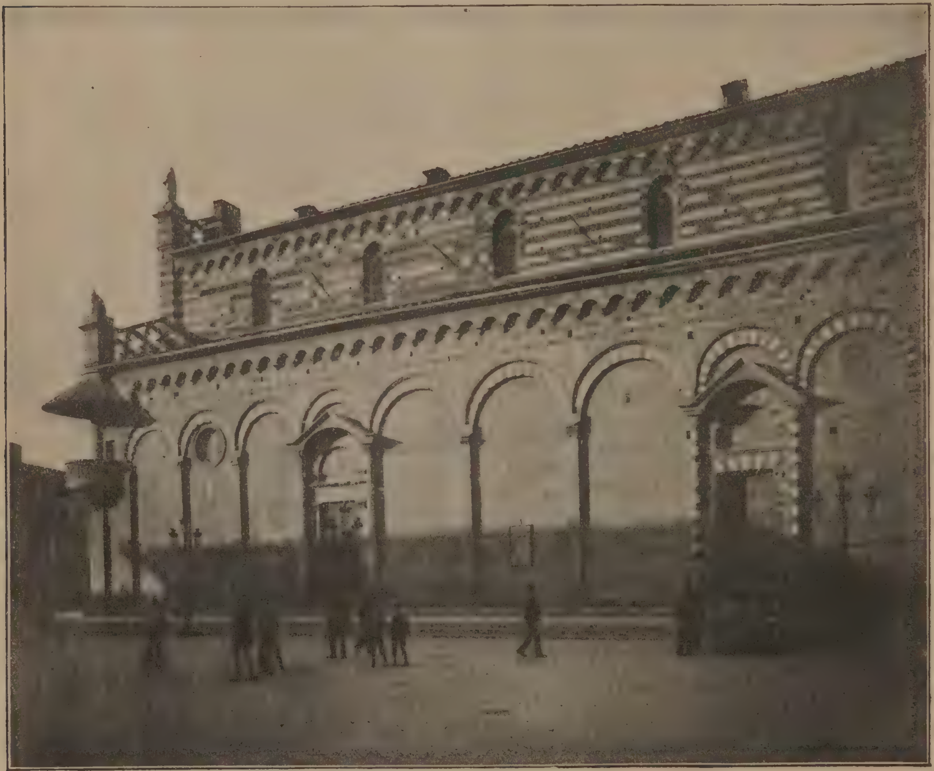


Fig. 9.—SIDE OF THE CATHEDRAL OF PRATO.

OSTON PUBLIC

In the direction from façade to transept the plinth drops 2.48 (feet and decimals), the earth's surface drops 1.01 and the arches rise 1.20, as measured to the plinth. This is an instance where settlement of the wall would probably be suggested by a hasty sceptic, but these measures show, if there has been such a settlement, that the arcades must have been originally 1.28 above level at the transept. The sceptic would then be obliged to account for an obliquity of the arcades and cornice above them, instead of accounting for an obliquity of the plinth.

Constructive obliquity being proven

for this case one cannot suggest any design excepting optical mystification. That such a mystification exists here is certain. The earth's surface, which really falls towards the transept, has the appearance from all points of view of rising toward the transept so distinctly that Mr. McKecknie took four successive levels and then concluded that his instrument had been damaged. My eyesight agreed with his in the matter so decidedly that we determined to obtain another instrument. We were much disturbed by our results because a number of previous surveys would have been vitiated by a damaged instrument. We could not say where or when the accident had occurred and we gave up work for the day with the belief that much of our labors in Italy might go for nothing. We accordingly went the next morning to an instrument dealer, deposited a hundred and fifty francs as security for a borrowed level, and returned to the church for another survey. After all this trouble it appeared that our own instrument had been accurate in the first instance. But the evidence of our eyesight continued to affirm what the evidence of the level denied. This instance does not prove that the mere illusion of a rising surface was the one especially sought, but the existence of this illusion is an illustration of the optical mystification which such a system of building produces. (The principle by which the falling surface appeared to rise, by contrast with the more pronounced fall of the plinth line, is familiar to experts in optics.)

In these various cases we find one controlling idea which takes us back to the round arch cornice of San Stefano at Pisa.* Every arrangement of like parts in unlike dimensions, or unlike relation, disturbs the point of view, puzzles the eye and throws the building into optical vibration—producing that effect of "life" which Mr. Ruskin has wonderfully described for a simpler class of phenomena in his "Lamp of Life" in the "Seven Lamps of Architecture."

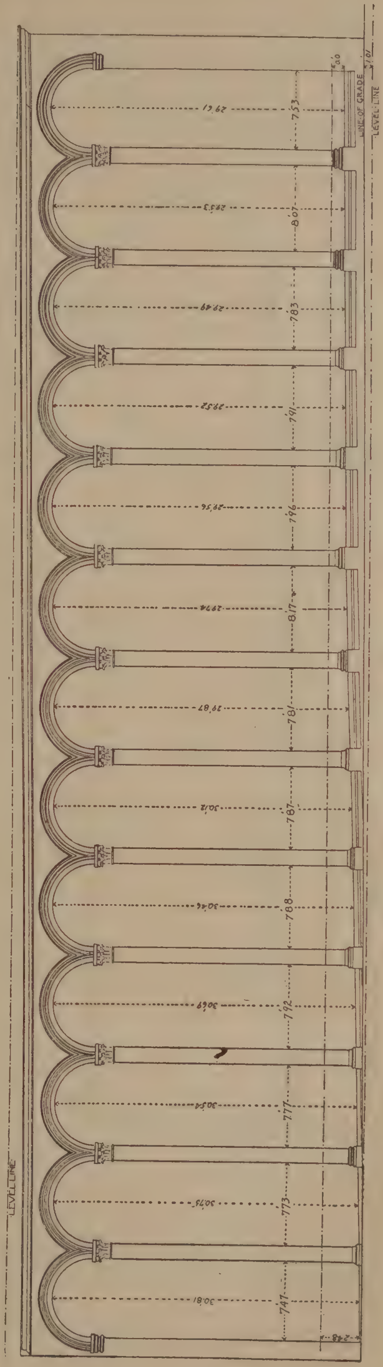


Fig. 10.—SURVEY OF THE NORTH WALL OF S. PAOLO RIPA D'ARNO, PISA.

The constructed obliquities of the Troja Cathedral, the Prato Cathedral and S. Paolo Ripa d'Arno at Pisa, suggest a reconsideration of the effects of the sloping string-courses of the Pisa Cathedral (matter of my last Paper). The effects are by no means confined to that of direct perspective which has been so far indicated. There is mystification from every point of view. If we stand opposite the centre of the south wall, one effect, that argued by the eye from the distances to the ends of the wall, is the effect of a centre view, but another effect, produced by the string-course, is that of being on the left of the centre. I will defy any one to fix the centre of the south wall at Pisa without a measuring tape; and one could fix the centre in any building which has a horizontal string-course without the slightest difficulty, by selecting the point opposite to which the string-course appears to be horizontal.

---

*See the October No., pp. 164, 165, and Fig. 3.

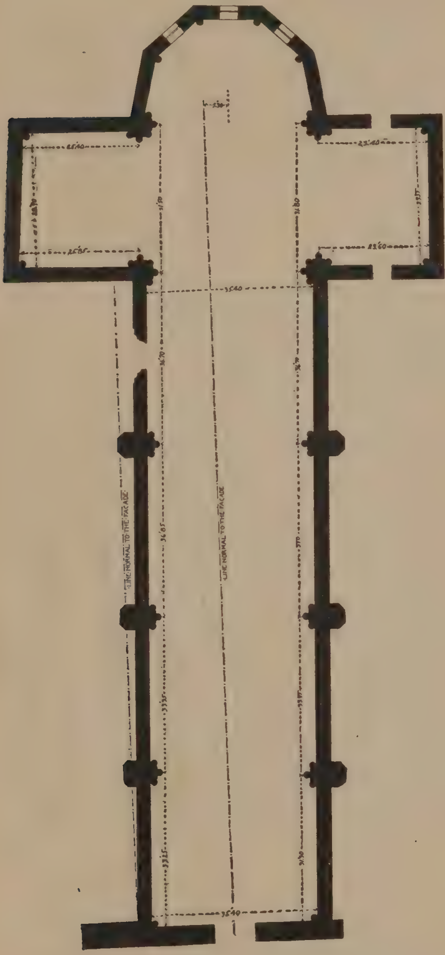


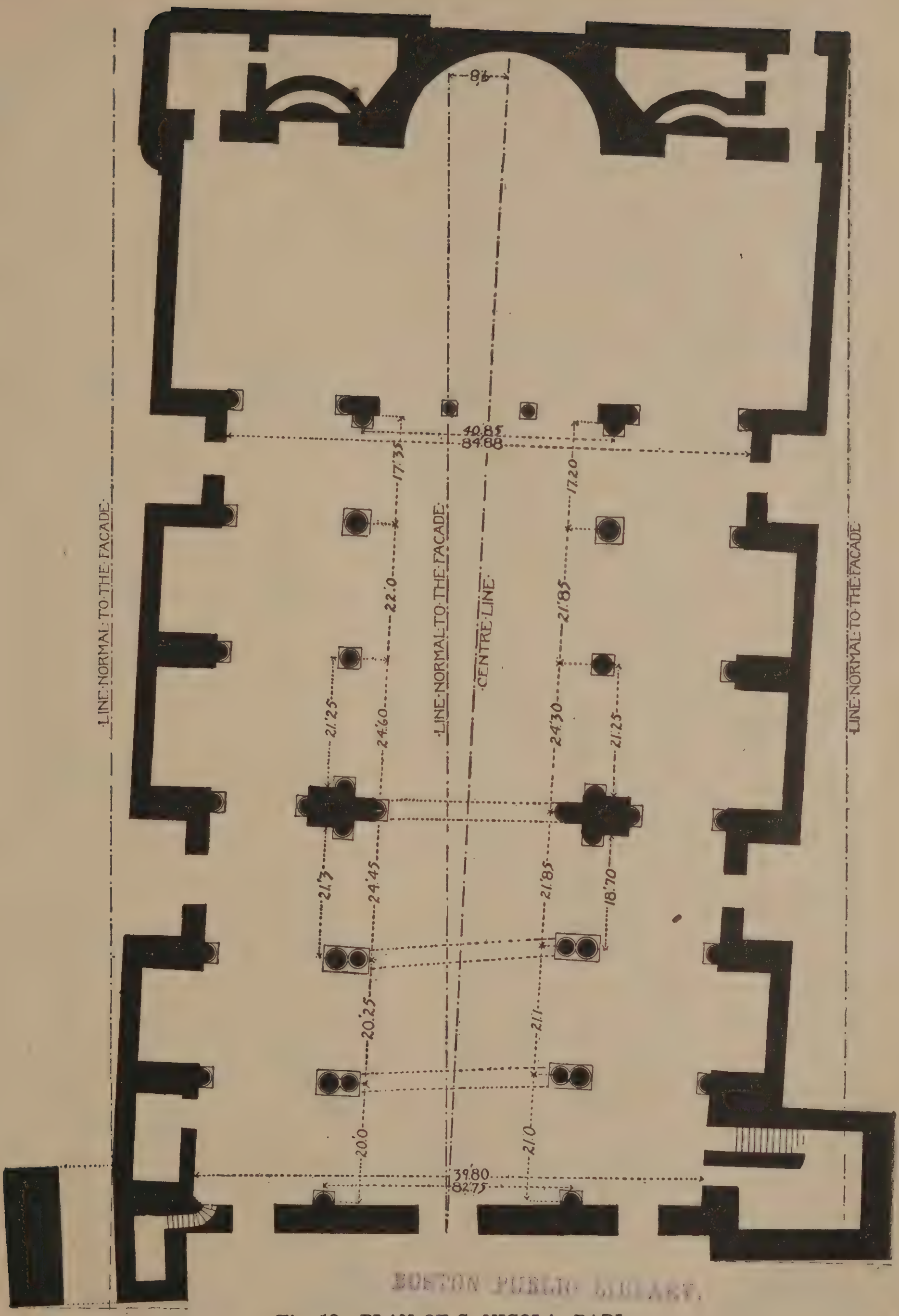
Fig. 11.—PLAN OF S. CHIARA, ASSISI.

The mysteries of the south wall are not yet exhausted, for it has also a pronounced curve in plan, to be illustrated in my next Paper.

The foregoing are a few facts chosen from a multitude brought out by the survey of 1895. When fairly viewed they prove that optical mystification, as distinct from a direct increase of magnitude, was intended by some of the irregularities of Italian medieval building. Some of the most important phenomena of this class have yet to be described.

In the ground-plans of Italian churches there are deviations from regularity which undoubtedly contribute to an effect of the picturesque. The proofs of intentional construction are of various kinds. We have, for instance, surveyed a series of cases in which the walls are oblique to the façade in one and the same direction. Among the most remarkable instances surveyed are S. Chiara at Assisi (Fig. 11), S. Nicola at Bari (Fig. 12), the cathedrals at Ruvo (Fig. 13) and Troja (Fig. 21),S. Bartolomeo at Rome (Fig. 14), the basilica of Castel St. Elia near Nepi, the Church of S. Giovanni in Zoccoli at Viterbo (Fig. 15), the Church of S. Maria della Pieve at Arezzo (Fig. 9 in Vol. VI., No. 1), the cathedrals of Orvieto (Fig. 16), Piacenza and Cremona (Fig. 17), and the churches of Toscanella (Figs. 1 and 18), etc. Some of these churches have one wall longer than the other. The Cathedral of Orvieto is twelve feet longer on the north side, the Church of S. Giovanni in Zoccoli at Viterbo is six feet longer on one side than on the other.

Let us first take a proof of intention from S. Chiara at Assisi (Fig. 11). Both walls are oblique in one direction; the widths of the church are identical to the hundredth part of a foot at the façade



BOSTON PUBLIC LIBRARY.

Fig. 12.—PLAN OF S. NICOLA, BARI.

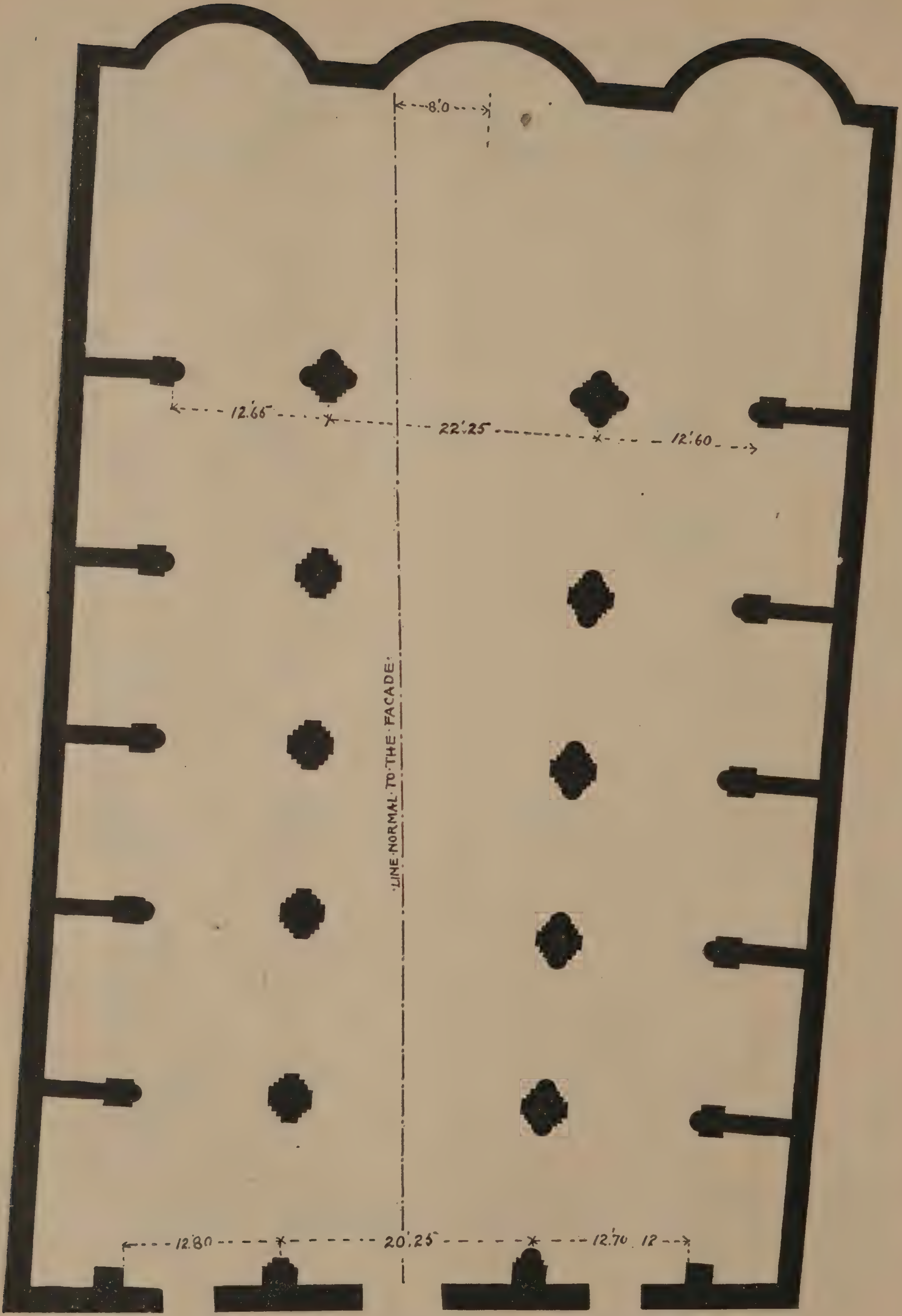


Fig. 13.—PLAN OF THE CATHEDRAL OF RUVO.

BOSTON PUBLIC LIBRARY.

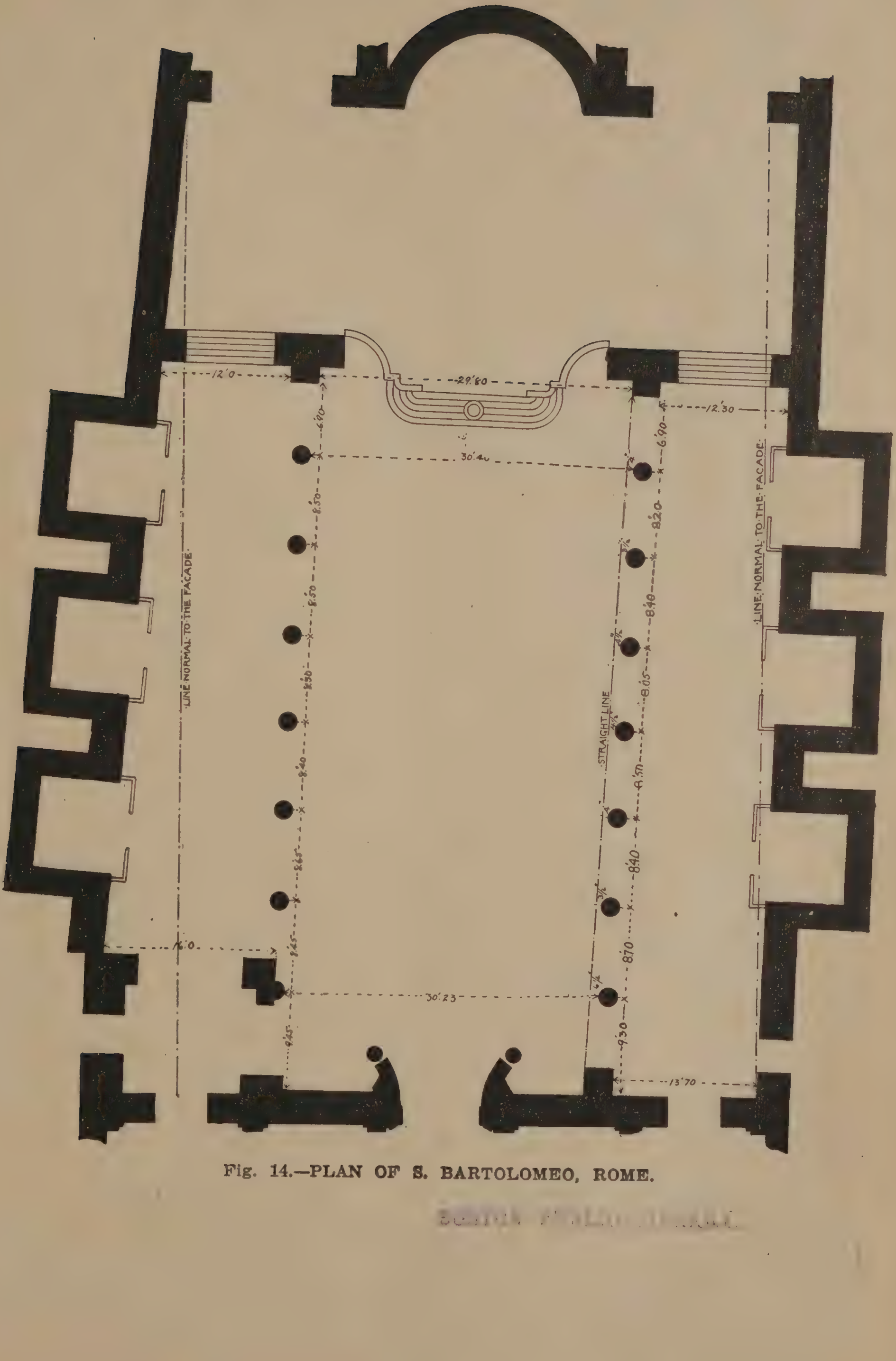


Fig. 14.—PLAN OF S. BARTOLOMEO, ROME.

BOSTON PUBLIC LIBRARY

and at the transept. In other words, the walls are exactly parallel in a deflection amounting to 5.30 for the length of the church. Can any one believe that these two walls are accidentally parallel?

At Orvieto, we have a proof of intention as to the irregular length of walls, which is obtained from the laying out of the piers of the nave (Fig. 15). After the entrance bay, for which the measures tally on both sides, each pier spacing on the left is longer than the corresponding one on the right. In the laying out of the nave the left side is therefore 2.35 longer than the right. This is obtained by a series of increments of which the lowest is 2-10 of a foot. This establishes two points—first, that the irregular length of the walls is intended; because it is related to an intentionally constructed and corresponding irregular length of the lines of piers in the nave; second, that the limit of error due to carelessness at Orvieto is *under* 2-10 of a foot. The measurements are found on our plan and are also given here:

Left, 32.0 ; 31.70 ; 32.45 ; 31.90 ; 31.40.

Right, 32.0; 31.40; 31.40; 31.70; 31.20.

We have another means of proving the obliquity of plan at Orvieto to be intended, because an obliquity of line is found in the projecting chapels of the left wall, which are built gradually shallower in the direction of the transept. The whole variation is one of about two feet, and it is produced by a graded series of minor deviations. As the chapels grow shallower, they also grow gradually wider. This scheme is broken at the chapel next the transept (Fig. 16).

For the Church of S. Giovanni in Zoccoli at Viterbo we have already illustrated the rising pavement (Fig. 24 of my last Paper). We turn now to the ground-plan (Fig. 15). The centre of the nave is deflected 4.90 from the normal line and the walls of the church are oblique to the façade in one direction. The left wall is 6.68 longer than the right wall. To show that this is not accidental we have only to examine the pier spacings of the nave. With exception of the bays next the entrance, where the discrepancy is only 22-100 of a foot in the other direction, every bay on the left is laid out in a larger dimension than the one on the right. This proves that the extra length of the left wall and the consequent obliquity of the wall of the apse, as compared with the façade, belong to the original plan of the church.

Our plan of S. Maria at Toscanella (Fig. 18) also contains internal proof of purpose as regards the unequal length of the walls. The left wall is 4 ft. the longer. Let us now compare the related measures for the intercolumniations of the nave. As found in the plan the measures run:

Left, 15.90; 15.80; 14.10; 13.80; 13.85.

Right, 14.50; 15.50; 13.85; 13.80; 13.80.

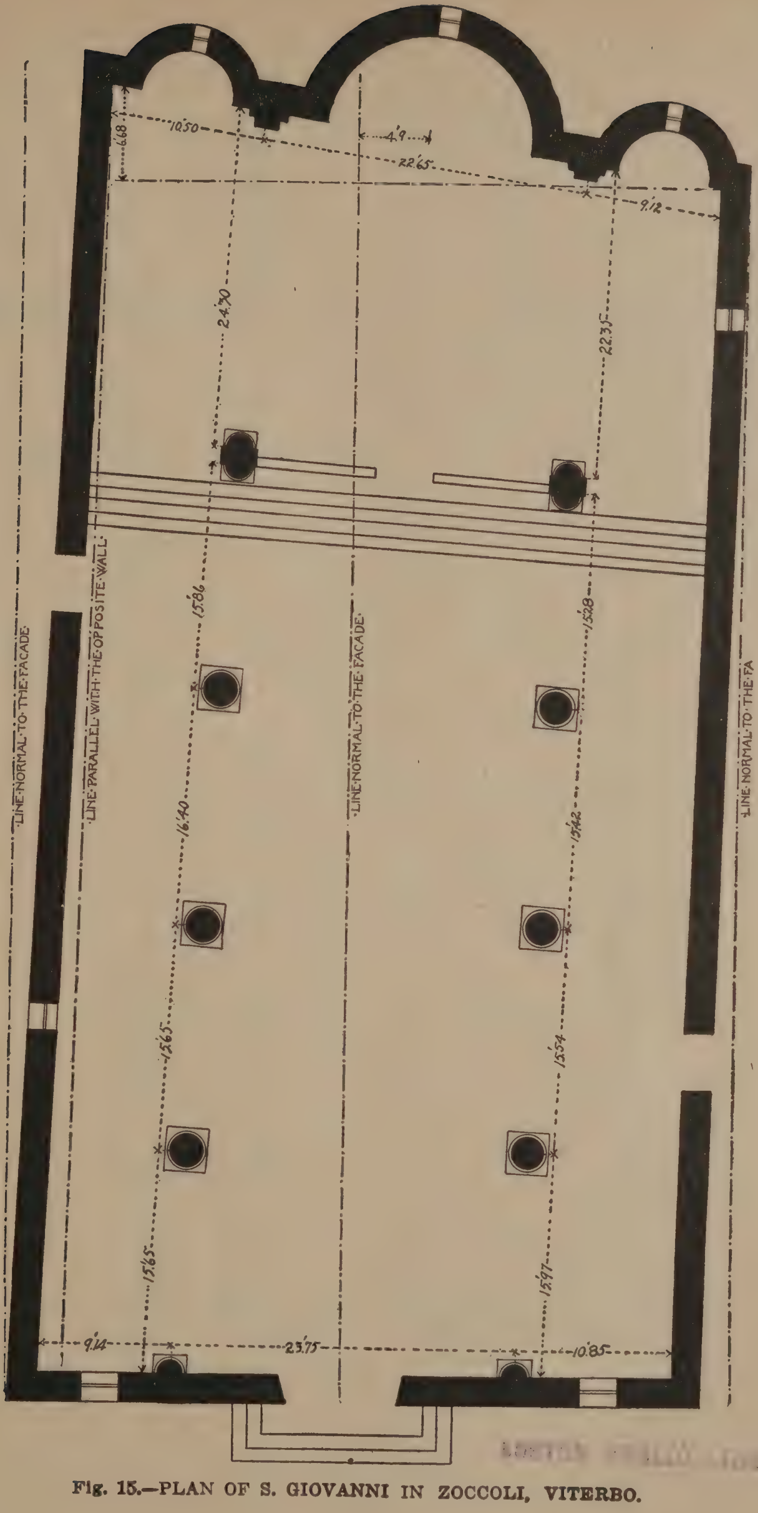
It thus appears that an extra length of 4 ft. in the left wall was connected with an increment of spacings on the left side of the nave ranging from .05 to .60. The measures for the choir show an increment of .90 on the left. (Students of this plan are warned that a comparison of the measurements for the wall arcades is complicated by the fact that there are eight on the left wall and seven on the right wall.)

For the question of intention in obliquities of interior plan the survey of S. Pietro at Assisi is instructive. For a section of this church showing a drop in the arches of 2.60 and a rise in the pavement of 1.70, see Fig. 7, Vol. VI., No. 1, of The Architectural Record. See also the photograph of this issue (Fig. 19). We will now consider the ground-plan (Fig. 20). The nave pier spacings are as follows:

Left, 18.50; 18.90; 17.80.

Right, 18.30; 19.0; 17.80.

Thus the first pair of arches are equal within 2-10 of a foot; the second pair are equal within 1-10 of a foot; the third pair are equal exactly. We therefore have the proof that the build-



BOSTON PUBLIC LIBRARY.

Fig. 15.—PLAN OF S. GIOVANNI IN ZOCCOLI, VITERBO.

ers knew what they were doing within 2-10 of a foot, and that they purposely made the second bay longer than the first, and the third bay shorter than the second. This appears because the variations are the same on both sides of the nave, within 2-10 of a foot. Now for the obliquity of lines in the choir. Before we reach the choir the left aisle shows measures at the two ends which correspond within 1-10 of a foot. The measures for the nave tally exactly at its two extremities. It does not therefore appear to be carelessness which causes the right aisle to be 1.85 narrower than its fellow at the entrance and 1.10 narrower than its fellow at the rise of the steps. If the builder could make the widths of his nave tally exactly as far as the rise of the steps, he probably knew what he was doing when he first widened it 1.60 and then contracted it 1.10 beyond that point.

All of the Italian ground-plans which have oblique exterior walls have interior obliquities in the lines of nave and aisles. In most cases there is a slight spread in the lines of the nave and a slight convergence of the lines of the aisles in the direction toward the choir. The purpose seems to have been an avoidance of mathematically parallel lines, with a view to an increase of picturesque effect.

From the standpoint of purely perspective effect there are contradictory appearances in all uses of converging lines in plan, and this is probably why the convergence of church walls toward the choir had no wide application. (About six cases are known to me in Italy, see last Paper.) If the lines of a nave converge in plan toward the choir and the arches do not drop correspondingly, the effect of the arches contradicts that of the lines in plan. If both devices are employed at once, detection of the trick is generally easy. (I do not know of any medieval Italian church in which both schemes were employed, but it was the method of Bernini in the Scala Regia of the Vatican.) On the other hand, if the lines of the nave diverge to the choir there is an increase of perspective effect as regards the lines of arches, which are thrown into more pronounced appearance of recession, although the lines in plan contradict the natural effect of perspective. Mystification of the eye, as distinct from direct increment of dimension, seems to have been the purpose of most cases of constructed asymmetry in the plans of Italian churches.

To continue the argument concerning constructive purpose of the oblique plans, we note the following as so far dealt with successfully: S. Chiara, Assisi; the Cathedral of Orvieto, Church of S. Giovanni in Zoccoli at Viterbo, Church of S. Maria at Toscanella. We may now add S. Pietro at Toscanella (Fig. 1) on the ground of the evidence for design in the pier spacing (p. 377). It is also impossible that the lines of the façade of this church should have been bent in plan by accident. This symmetrical bend in plan of the façade belongs to a class of facts to be considered in the next issue.

An impregnable case of constructive asymmetry is offered by the plan of S. Nicola at Bari. The side walls are broken by recesses for side entrances at two points on each side (Fig. 12) and yet the continuity of the obliquity is unbroken in the main exterior lines. Incredulity as to constructive purpose, in face of this plan, is either the result of stupidity or of wilful indifference.

For all the cases of the oblique plans taken collectively it is a point that our survey has found no churches in which both walls make an obtuse angle with the façade. The fact that the walls are always oblique in one direction is a strong argument in favor of design. Explanations based on local causes are out of the question, in view of the number of examples (about thirty-five cases), and this possibility has, moreover, always received careful attention from our survey in face of the monuments, but without finding anything in its

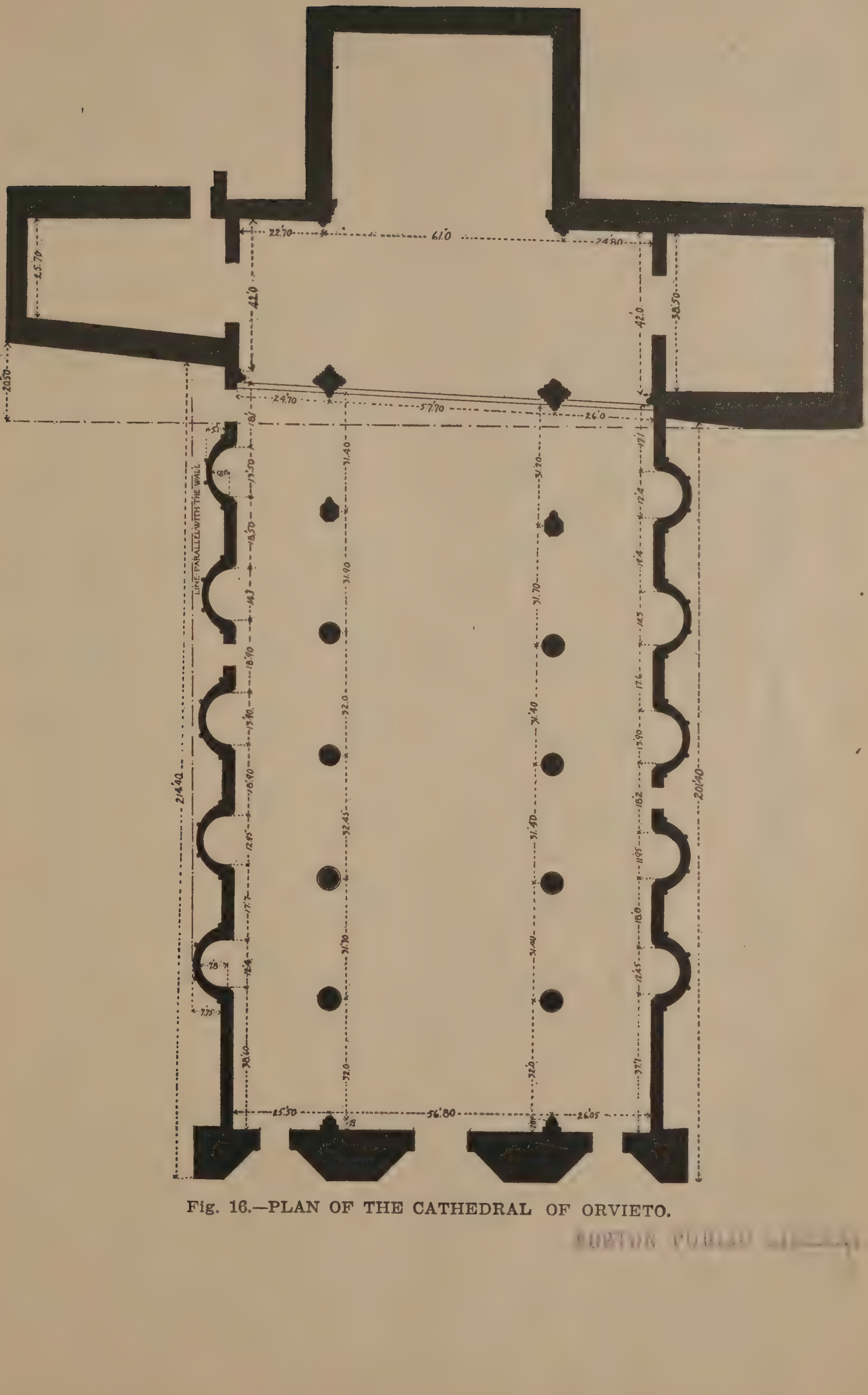


Fig. 16.—PLAN OF THE CATHEDRAL OF ORVIETO.

BOSTON PUBLIC LIBRARY

favor as a universal or general explanation.

Another kind of evidence as to intention is that drawn from other pronounced irregularities of a given plan. In the case of S. Nicola at Bari (Fig. 12) or of S. Maria della Pieve at Arezzo (Fig. 9, in Vol. VI., No. 1), the variations of pier spacing are so extraordinary, that it is impossible to assume either carelessness or accident. To these considerations are added those based on the appearances in the same churches of other schematic irregularities already considered or to be considered. We have this kind of evidence at Bari (Fig. 12, compare the last Paper), at Troja (compare the last Paper and also this one), at Cremona (compare the last Paper), at Piacenza, Toscanella (schemes in the arches or pier spacings); at Viterbo and Assisi (the sloping pavements), etc.

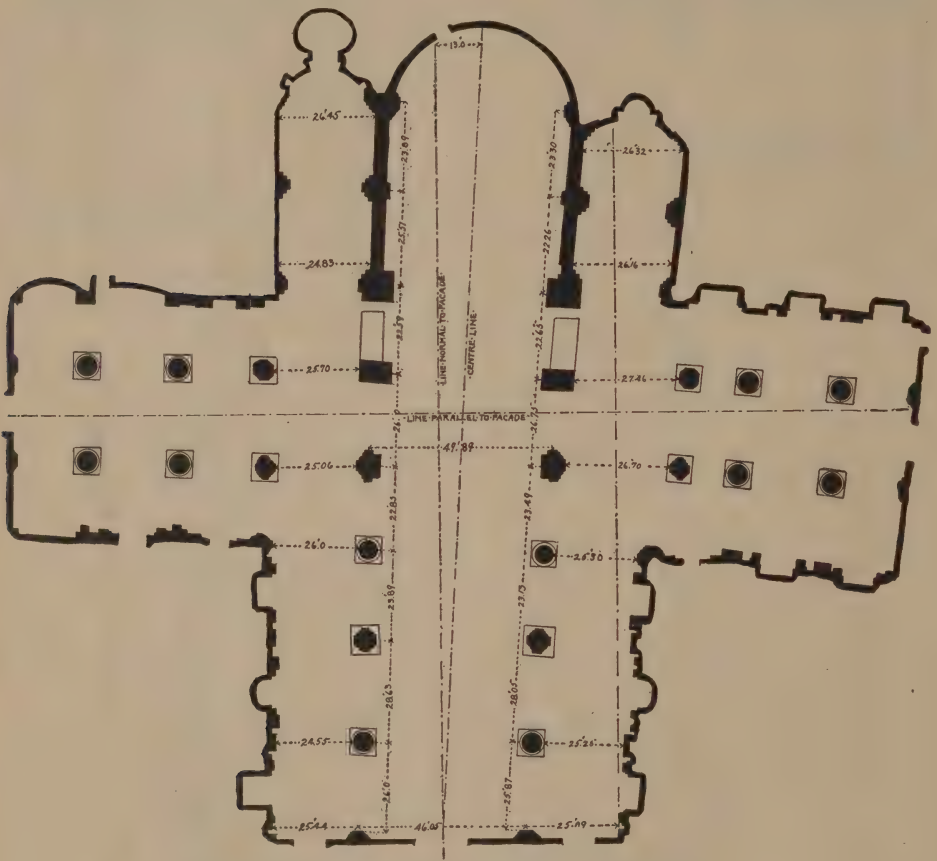
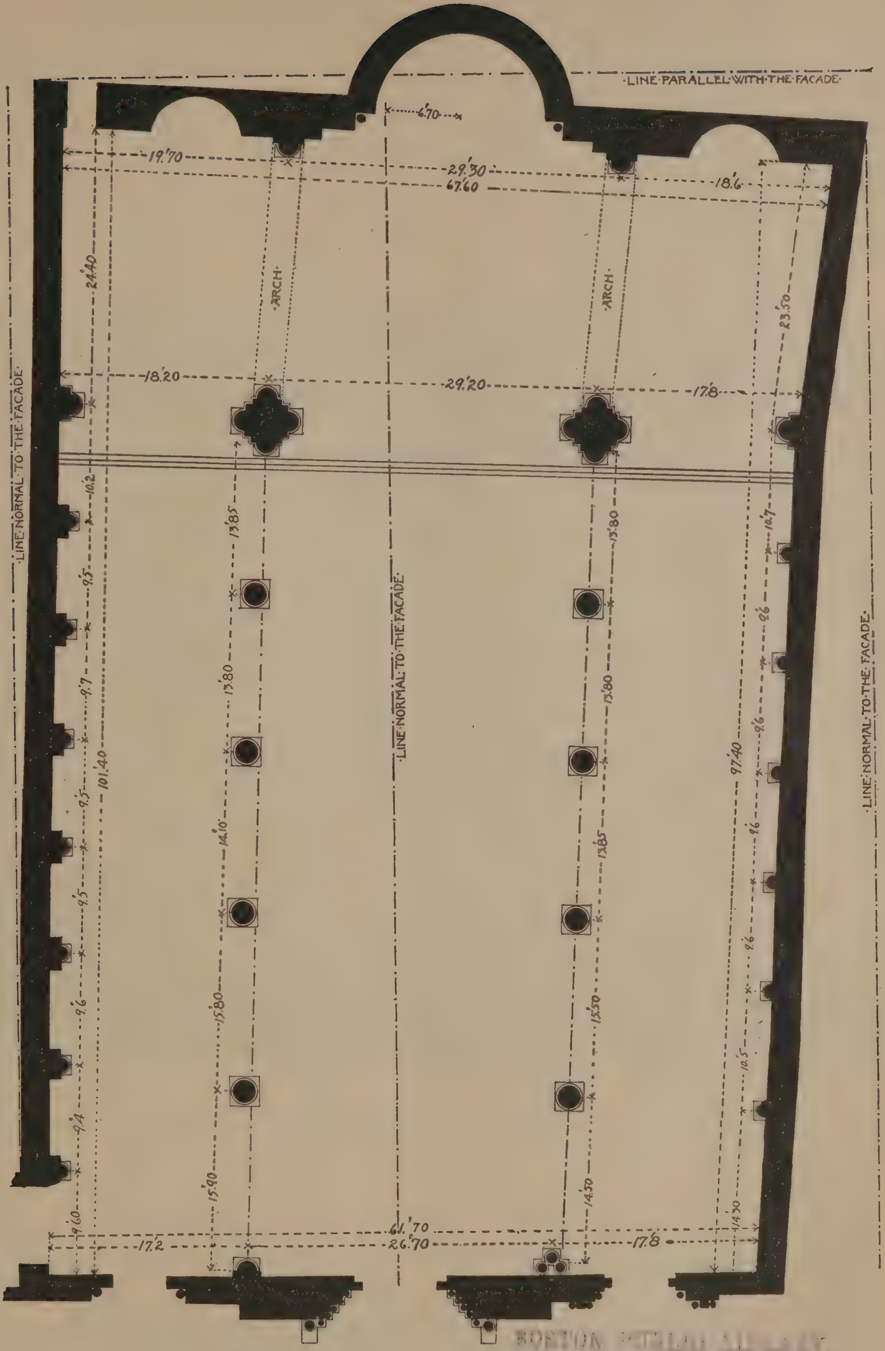


Fig. 17.—PLAN OF THE CATHEDRAL OF CREMONA.

The theory that the builders of such churches were unfamiliar with the methods of laying out regular plans is negatived by the number of regular plans. There are, for instance, five medieval churches in Viterbo with regular plans. Oblique plans are the exception, not the rule, when the whole number of churches is considered.

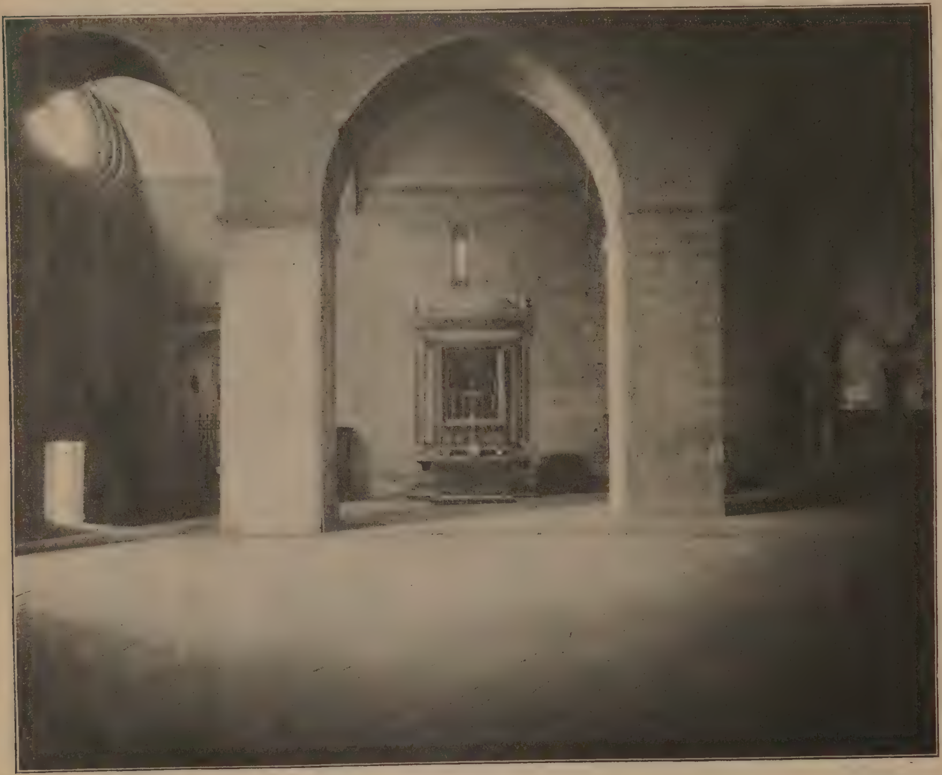
A word or two as to the effect of these oblique plans on the eye of a person in the church. Strange and extravagant as they appear on paper, there is not one of them (not even the plan of S. Maria della Pieve at Arezzo)



BOSTON PUBLIC LIBRARY.

Fig. 18.—PLAN OF S. MARIA, TOSCANELLA.

which does not keep inside the limit of conspicuous irregularity. There is again here an argument against the supposition that pure indifference to symmetry is the cause. If this indifference were the cause we could not explain why this limitation of the inconspicuous is preserved. In the buildings, one simply has a picturesque result. You think yourself at the side of the church when at the centre, or *vice versa*. Your point of view is changed or confused or doubled, but you are not aware of anything irregular until the measures are taken. At Ruvo,where the deflection is eight feet, Mr. McKecknie asked me what I had brought him to survey, when I first took him inside the church (Fig. 13). The little Church of S. Stefano at Pisa has an oblique plan, but so inconspicuously that I have no survey for the fact, for I only noticed it on the last day that I had to spend in Pisa, having given five weeks to its buildings and having been in this church five times for measures and photographs. We had an amusing experience at Castel St. Elia (near Nepi and south of Viterbo), where the church is deflected 8¼ feet in 80 feet, the walls being parallel. It is a prilgrimage church in an out of the way locality, which is in charge of a very intelligent German sacristan, a lay brother, who has been delegated by his Order at Rome for this work, and who takes great interest in the building. He had much to show us, but was beside himself with surprise and interest when I showed him



BOSTON PUBLIC LIBRARY.

Fig. 19.—S. PIETRO, ASSISI.

Compare Fig. 20. Photograph in parallel perspective, showing the rising pavement and drop in arches in the direction of the choir. Compare the section, Fig. 7, Vol. VI, No. 1.

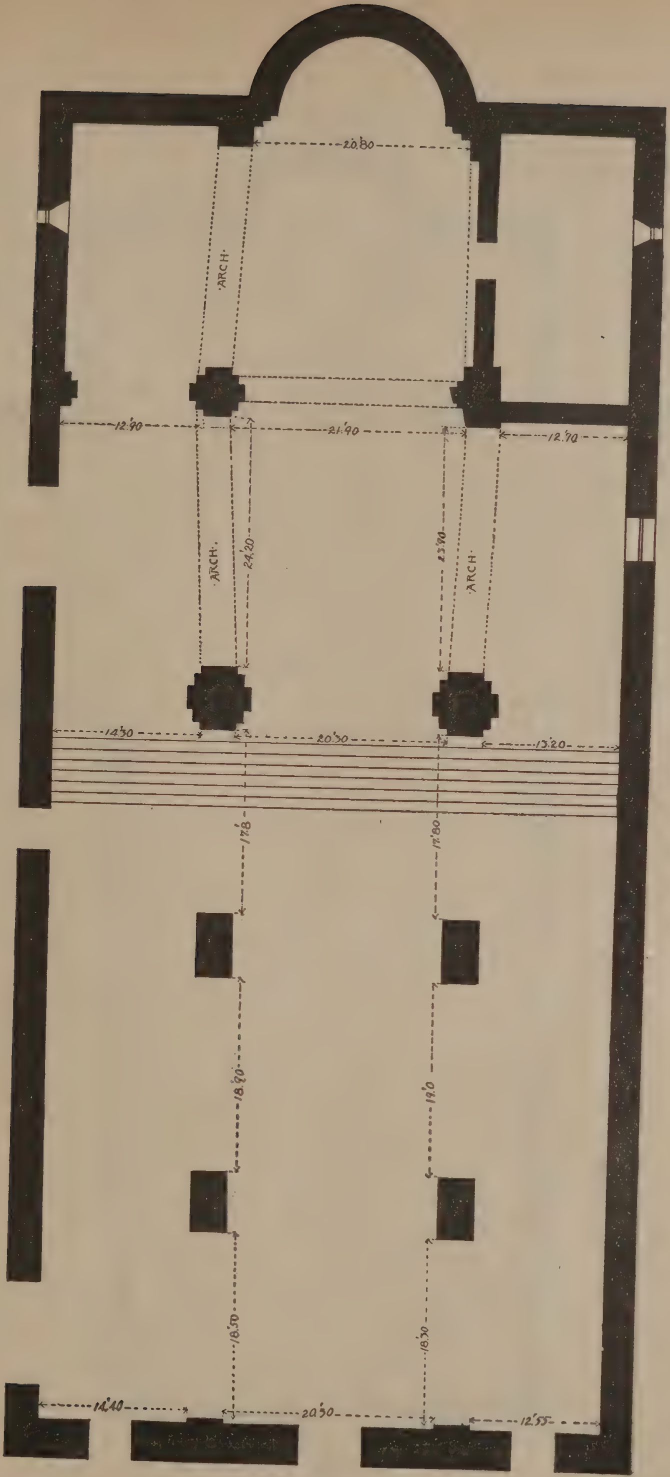


Fig. 20.—PLAN OF S. PIETRO, ASSISI.
Compare Fig. 19.

BOSTON PUBLIC LIBRARY.

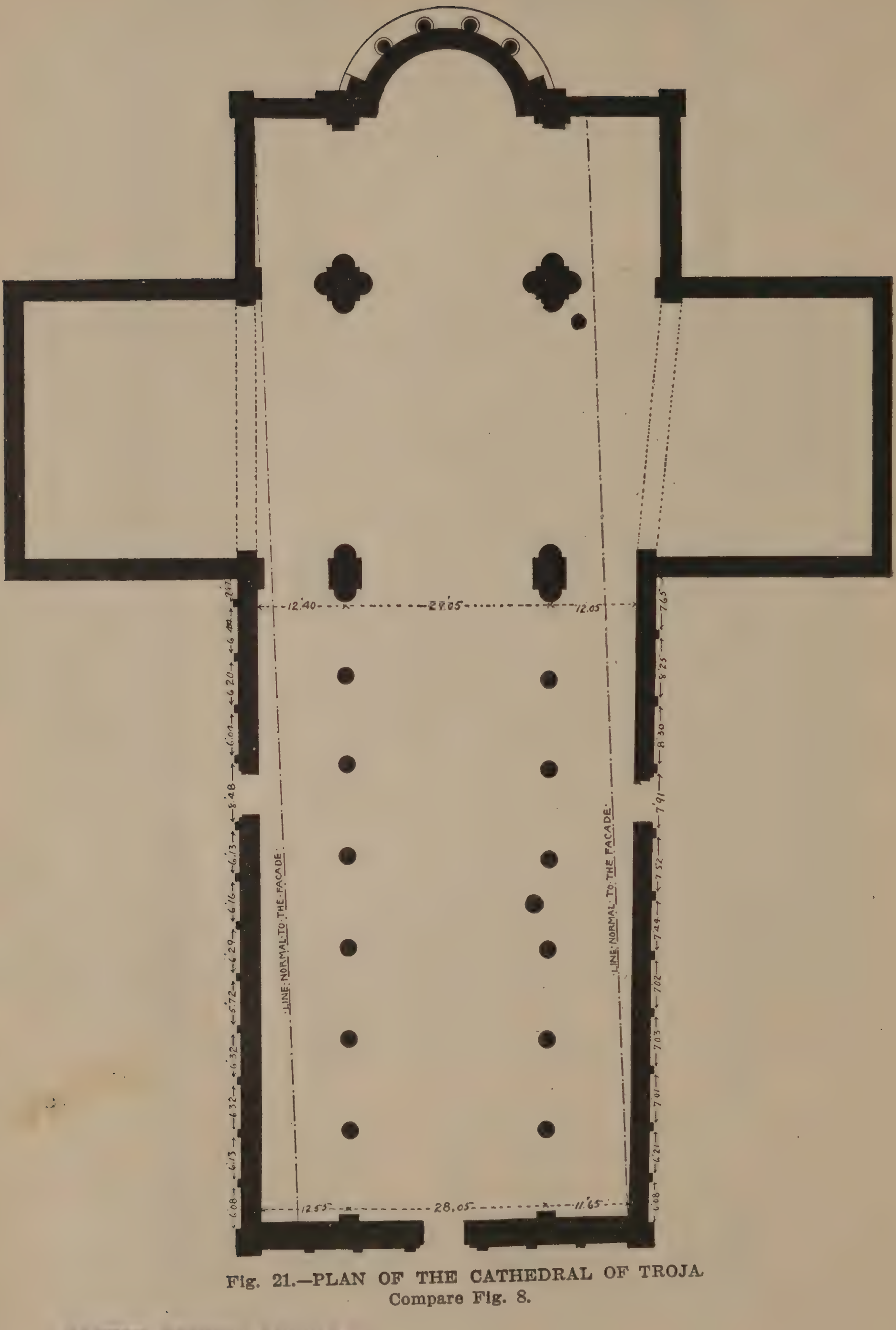


Fig. 21.—PLAN OF THE CATHEDRAL OF TROJA
Compare Fig. 8.

BOSTON PUBLIC LIBRARY.

the obliquity of plan. He had never seen it before, and remarked that about fifty students had visited the church during his charge of it, to make sketches and observations, but that no one had ever taken notice of this construction. The sacristan at Piacenza is, however, well aware of the peculiarity of this cathedral, and believes it to be due to an earthquake.

Our party had no notion that one wall of San Giovanni in Zoccoli at Viterbo is six feet longer than the other until the measures were taken. Neither did we know that one wall at Orvieto is twelve feet longer than the other until the survey proved it.

There are no counterparts known to me in publication of such oblique plans as we have surveyed at Bari, Ruvo, Troja, Castel St. Elia, Viterbo, Toscanella, Assisi, Arezzo and Orvieto. Cremona and Piacenza approach more nearly to some plans known to me in Northern Europe. There are published plans of Bari, Ruvo and Troja; but they are incorrect. Besides the churches above named as carefully surveyed in 1895, I have made personal observation of similar churches at Andria (near Barletta), Bitetto (near Bari), Nepi, Narni, Spoleto, Perugia, Montefalco (near Foligno) and Montefiascone (near Viterbo).

We are dealing here with facts which bring us face to face with the problem of the deflected plans of North European cathedrals; deflected, that is, as regards the choir, but not oblique as to the façade. Many cathedrals of Northern Europe have a deflected choir. Regarding the churches of France and England, it is fashionable to speak of this eccentricity as representing the bending of the head of Christ on the Cross. It has been proven that there is no literary authority for the supposed tradition.* I have not found any trace of this tradition in Italy. It may be that this supposed tradition is either a suggestion of some modern sentimentalist, which has spread from one point to another, or else that it was an afterthought of the Middle Ages, which had lost sight in some places of its own original motive in deflecting these plans. Another possibility would be that some medieval master-mason, or guild of masons, had found this suggestion more attractive to the clergy than the true artistic reason. How should we, at all events, explain those oblique Italian churches which have no transept and no cross form, as representing the bending of Christ's head on the Cross? What suggestion shall we make, on the basis of such a theory, for the churches whose walls are oblique to the façade but whose plans show no bend? But these plans grade in two directions. On the one side they grade over to plans with the deflected choir. On the other side they grade into plans in which the lines of the nave are curved, but which have no exterior deflection or obliquity.

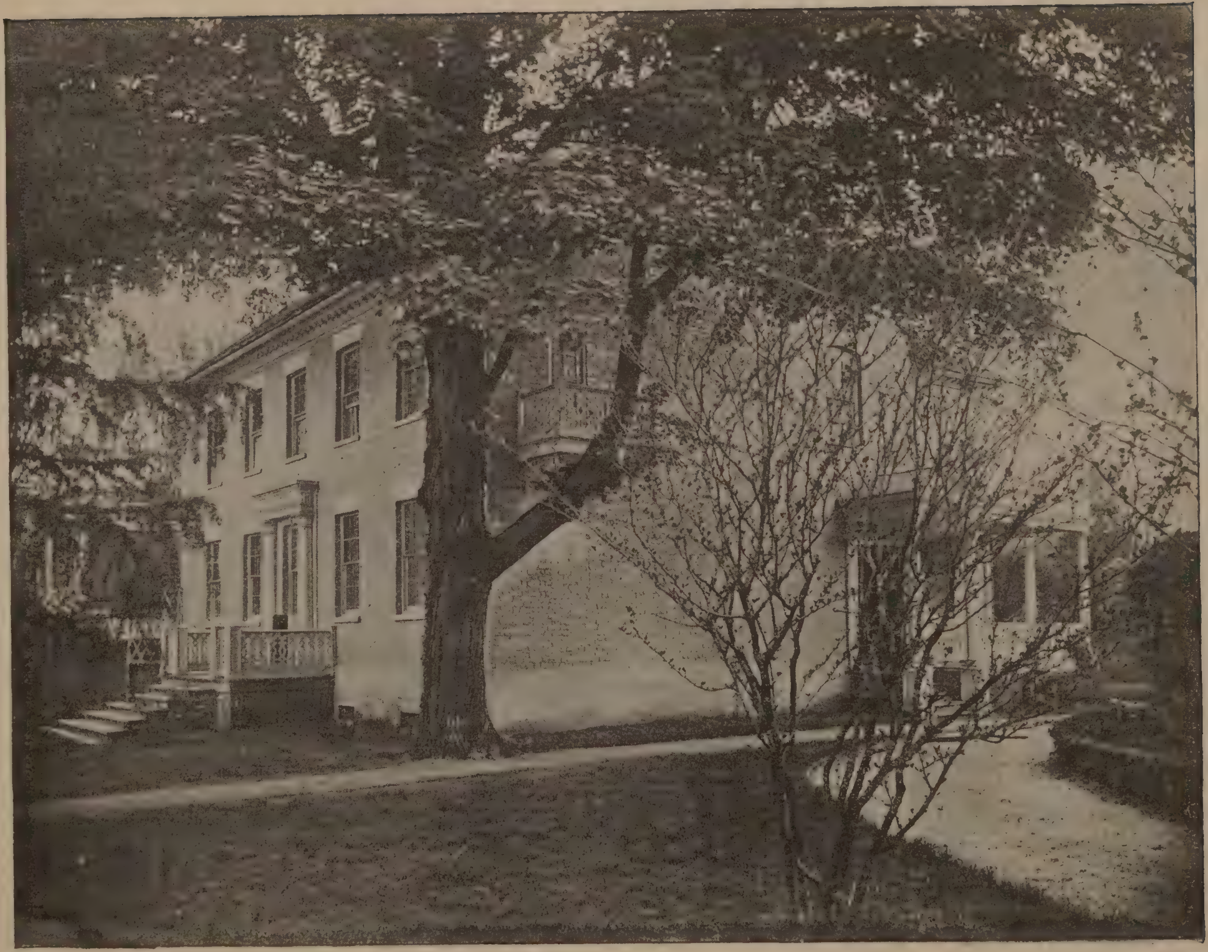
The Cathedral of Fiesole (ground-plan in the next issue) will serve as a type of a church having a rectangular plan, whose clerestory walls and pier lines are built in parallel curves. In this church and in other similar ones, we have no transept and no cross-form. Symbolism is at fault here, and constructive purpose cannot be denied for curves which begin in the foundations of the building. I shall therefore move to the consideration of curves in medieval Italian churches by way of the curves in the plans of the naves, to be first illustrated from Fiesole, Ravenna, Toscanella, Siena, and Pisa.

Wm. H. Goodyear.

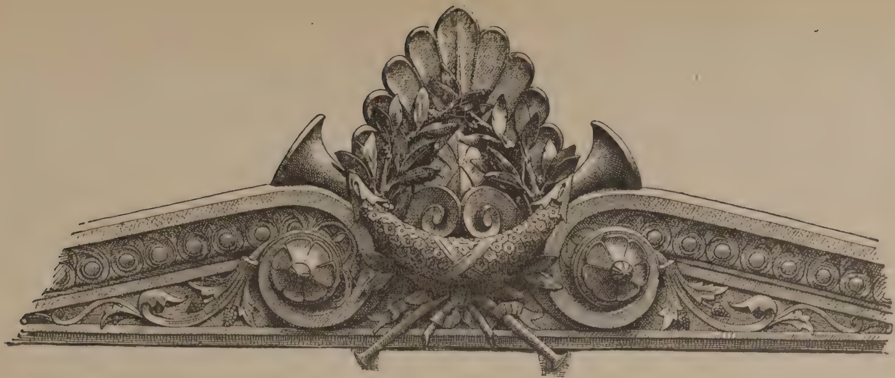
(*To be Continued.*)

---

*See a discussion of this subject by many competent authorities in "Notes and Queries," Second Series, Vols. X. and XI.



Annapolis, Md. BOSTON PUBLIC LIBRARY OGLE HOUSE,



NEW BOOKS.

EUROPEAN ARCHITECTURE: A HISTORICAL STUDY. By Russell Sturgis, A. M., Ph. D., F. A. I. A., President of the Fine Arts Federation of New York, Past President of the Architectural League of New York, Vice-President of the National Sculpture Society, Honorary Member of the Mural Painters, &c. New York: The Macmillan Company. London: Macmillan & Co.

Of late there has been a noticeable addition to English architectural literature. Let us be thankful, the addition, in the main, has been to the very class of works wherein our literature has been remarkably deficient. The French student of architecture, and the German student, have had at hand for years an abundant elementary library, whereas the Anglo-Saxon, confined to his proper tongue, has been very poorly provided. It is much to be able to say that this deficiency, in its grosser respects, exists no longer. Of handbooks, compendiums and the like, intended for the class-room and the general reader, there have appeared quite recently Hamlin's "History of Architecture," Statham's "Architecture for General Readers," Fletcher's "History of Architecture," Goodyear's "Roman and Mediaeval Art," "Modern Art," Mathews' "Story of Architecture," Russell Sturgis' "European Architecture," in addition to numerous translations, special studies, and "picture books," of which Mrs. Van Rensselaer's "English Cathedrals" is an example. This is only a partial list, but if we may take for granted that publishers know their market, it is long enough to warrant the supposition that the public is giving somewhat more attention to-day than in the past to the art it is perhaps more ignorant of than any other of all the fine arts. However, the quantitative aspect of this bookmaking is not the most deserving of attention. Already too large a part of our literature dealing with art is pure vexation. There is, indeed, some analogy between books upon art and books upon the manners and customs of people—authorship is rarely assumed by the really competent, the artist, the native-born. Perhaps this is so because all that is so highly interesting to the outsider, the foreigner, in proportion to its novelty, presents to the indigine no external aspect, and in that respect is really foreign to his consideration in proportion to its familiarity. We all know how much of his subject even the "intelligent foreigner" misses or perverts, and in art the alien view goes scarcely closer to the centre. Moreover, art is not a subject that itself imposes rigorously upon an author unavoidable qualifications. With Science or History, for instance, a writer must perforce work from recognized, established bases; or at least he must, at the outset, square himself with a body of well-defined knowledge, which is, in itself, an intensely critical force. Little of the kind guards the Fine Arts against unfortunate intrusion. It is the province of letters wherein the writer has least the sense of convincing police regulations.

The foregoing brings us to our immediate object—Mr. Sturgis' new book. It is not only one of a number of works put lately into the hands of the public, a serious attempt to interest people in architecture, but it is particularly notable as being a book by an architect, and an architect of solid attainments, who has been a life-long practitioner of his art. The writer, moreover, is an American, and the thought must have occurred to many that if ever we obtain in English a really sufficient history of architecture, most probably it will be written by an American. One could not expect it from an Englishman—though this is not the British opinion. The Englishman's native predilections are naturally too strong, except under extraordinary circumstances, to permit that complete detachment from traditional and innate bias essential to an impartial and nicely balanced treatment of an art wherein so many diverse moods and ideals have found expression. Indeed, is it not in this very matter of unconscious detachment from national prepossessions that the German, with all his knowledge, and the Frenchman, with all his critical tact and lucidity, fail somewhat when they have to deal with really alien types of artistic creation? It is here that the American is peculiarly and fortunately free. He is supremely independent of any national or traditional attachments for any architectural style or phase of style. The very circumstances that have made the practice of architecture in the United States so raw, unfixed, eclectic, form for the American historian and critic a species of natural endowment of a high order. What we have lacked hitherto for performance has been interested scholarship, and here, again, Mr. Sturgis' work arouses our expectations, for the author's scholarly knowledge of his subject is beyond question. What, then, is the result?

The title of the book implies limitations that are more than geographical. A general history of architecture that begins elsewhere than at the beginning must exclude a thorough-going scientific treatment of the subject. Yet, let us admit, at once, the very last thing a really scientific treatment would hazard with our present knowledge is a single definite word about origins. The debt of Greece to Egypt, or Mesopotamia may be admitted. Nevertheless, so much is pure conjecture that the safest course is to say the least about the matter. Therefore, in a book intended for general readers Mr. Sturgis is right in ignoring the subject. For such, European architecture begins in Europe. We refer to the restriction solely because an author's choice of his own ground is a matter of significance. It usually indicates broadly his personal way of thinking and shows us the bent of his speculation. In Mr. Sturgis' case we have indicated for us at the outset a scholarly caution and an instinctive distaste for all that is tenuous and unsettled, which are among the admirable qualities of this work. This judicious reticence impresses itself upon the reader more and more as he proceeds from chapter to chapter, until he perceives that he has been kept with unusual rigor to a certain order of facts—the concrete facts. This building or that is perpetually in sight. The study is, he observes, as it were, conducted always on the spot. The subject before him is ever a matter of masonry, a method of construction, a circumstance of decoration—but the last very much more rarely than the others. The eye, indeed, is held so close to the facts of structure—to column, pediment, vault and buttress—that one catches scarcely a glimpse of the building free-standing as an artistic whole, in the open air, against the sky, with its historical surroundings. No; it is the anatomy of the styles that we are mainly directed to study, those elements of a building that can be dated exactly, accurately measured and correctly computed. This is the physiology of architecture. "Wherein does Gothic architecture differ from Romanesque architecture, and what are the causes of the difference? *These causes are to seek in a minute comparison of the works of the Gothic and the Romanesque builders.*" The italics in this quotation from the preface are ours. These sentences are the keynote of the entire book. It is impossible to be more cautious, to hazard less. The mental element, the temperamental qualities revealed in the artistic productions of a period are eliminated from consideration. A building, a style, is isolated from the civilization of which it is an expression. Yet, some, we are sure, will affirm that it is in a given civilization that are to be found the chief constituents of a given style. There we must seek the fundamental difference between—to keep to Mr. Sturgis' example—Romanesque architecture and Gothic architecture. To search for the causes of that difference "in a minute comparison of the works of the Gothic and the Romanesque builders" is to make cause and effect synonymous and confound the product with what produced it. Moreover, if a mechanical principle, as that involved in Gothic vaulting, be the centre of a style, does not that view, in appearance at least, separate architecture from the other arts and from all the other circumstances of the period? If the Gothic style is essentially a certain system of construction, how are we to bring it into relationship with the stained glass, the stone carving, the iron-work which adorn that system of construction? Surely the chants that arose in the cathedrals of the thirteenth century, the very vestments of the priests, the furniture of the altars, the phraseology of the litanies and prayers were innately akin to the structures that were their proper setting. Their common denominator was the chief factor of the Gothic style, and that common denominator was the spirit of the age.

Mr. Sturgis, however, declares that enquiries in these directions are "rather for the scientifically inclined than for those to whom decorative art is the chief matter. For these last, the analysis and criticism of their beloved art itself is quite enough." Undoubtedly, this is exactly the architect's view; and if we turn to the architect for our history of architecture we must be prepared to accept it with large limitations, finding compensation for what is missing, as no doubt we shall find compensation, in the treatment of purely artistic questions.

Needless to say, we have no quarrel with the position Mr. Sturgis takes. We have no right to insist that he ought to be interested in other matters besides the "analysis and criticism" of his art. He is not; he says so. True, this position limits the scope of his work. But that acknowledged, the questions are: Is the work, as done, worth doing; and, is it well done? The answer to the first is obvious. It is what we need in English before all else. Regarding the performance likewise there can be no possible doubt.

It is admirable throughout in the highest degree. We have no other book comparable with it; none that is quite so substantial. In thought, matter and style the volume is remarkable. It is the ripe product of high scholarship, and we are sure that every lover of architecture will close his reading of the book with the sense of pleasure one obtains from all thoroughly excellent achievements. And how delightful the reading itself is. A certain compactness of treatment is a marked characteristic of the work. The compression, however, is obtained without dryness or obscurity; on the contrary, it is accompanied by a notable minuteness of qualification and a fine interjection of detail that deserve particular attention. The following extract is a good example of the qualities we have spoken of:

> When, therefore, men's minds were turned toward a revival of classical learning, as they were more and more, continually, during the years following 1400, there were found some among the younger students of building and engineering who were eager to study the Roman monuments thoroughly, and with a view to working in the same style. * * * *
>
> Among these young men was Philippo di Ser Brunellesco, an able sculptor in 1401, and one of those who, in that year, had competed in the matter of the third pair of doors for the Florentine Baptistry. When Ghiberti had been successful in this competition, Brunellesco went to Rome to study ancient buildings. Returning to Florence at some time before 1415, he proposed to finish the cathedral by roofing the great octagon (see Fig. 166 B), not as it had been contemplated, but in a more classical taste.
>
> About 1420 work upon this began under his directions, and the present cupola was the result. This is one of the greatest achievements in architectural art. The cupola of the Pantheon at Rome, the largest one known, and obviously Brunellesco's chief inspiration, is circular, is supported by a massive circular wall, and is kept in place by enormous masses of masonry piled upon its haunches. The dome of the so-called temple of Minerva Medica is much smaller, and this, and all other Roman domes which Brunellesco could have studied, are of a massiveness which he did not try to rival. We have no reason to suppose that he studied H. Sophia of Constantinople, or other Byzantine examples, and no cupolas properly so called had been built in Western Europe during the Middle Ages. Brunellesco's work was a marvel of invention and boldness, for his dome, only two feet less in diameter than that of the Pantheon, is light and lofty, octagonal instead of round, and raised upon a high octagonal drum, which rests upon open arches. This cupola was calculated, also, to support a terminal structure, which, built after Brunellesco's death, is in itself a masonry building eighty feet high. Later architects, working in the same direction, have found it very difficult to make a bulging shell of masonry support such a lantern. This astonishing feat must have given Brunellesco supremacy among the builders of the day, but it does not show any marked preference for Roman forms. He had gained inspiration from them in the right way, and in the right way had designed and built an original work.
>
> In the Pazzi chapel, adjoining the church of S. Croce, in Florence, the Roman details appeared, probably, for the first time (see Fig. 192). The vaulting here is Roman in principle; that is to say, it is built as a single arched shell without ribs; but such vaulting was a commonplace of Italian buildings, and was free to any one to use; the Roman imitation appears in the decoration of the surface of the vault by coffering in the columns with Corinthian capitals, the elaborate system of Corinthian pilasters large and small, and the frieze decorated with the strigil ornament copied from some antique sarcophagus. This is the beginning of modern imitative architecture. It is, moreover, the only building, as it appears, in which Brunellesco tried to use Roman forms as the Romans had used them. Had the church S. Maria degli Angeli in Florence been completed, the Roman experiment would have been tried more thoroughly in it, but this has remained a fragment. In the Church of S. Lorenzo, built during Brunellesco's life, and that of S. Spirito, built after his death, from his plans, both in Florence, the Roman column is used, and a semblance of the Roman entablature serves as a kind of larger abacus or second capital, but the arches spring directly from the columns in a fashion not identified with the true official Roman style of the second century (see Ch. II), and the entablature is so slight and small as to contradict Roman proportions altogether. Finally, in the front of the palace Pazzi-Quaratesi, there is nothing that an architect of the Roman Empire could have used. This is a palace-front of the type familiar to us, with pointed arches and arcaded

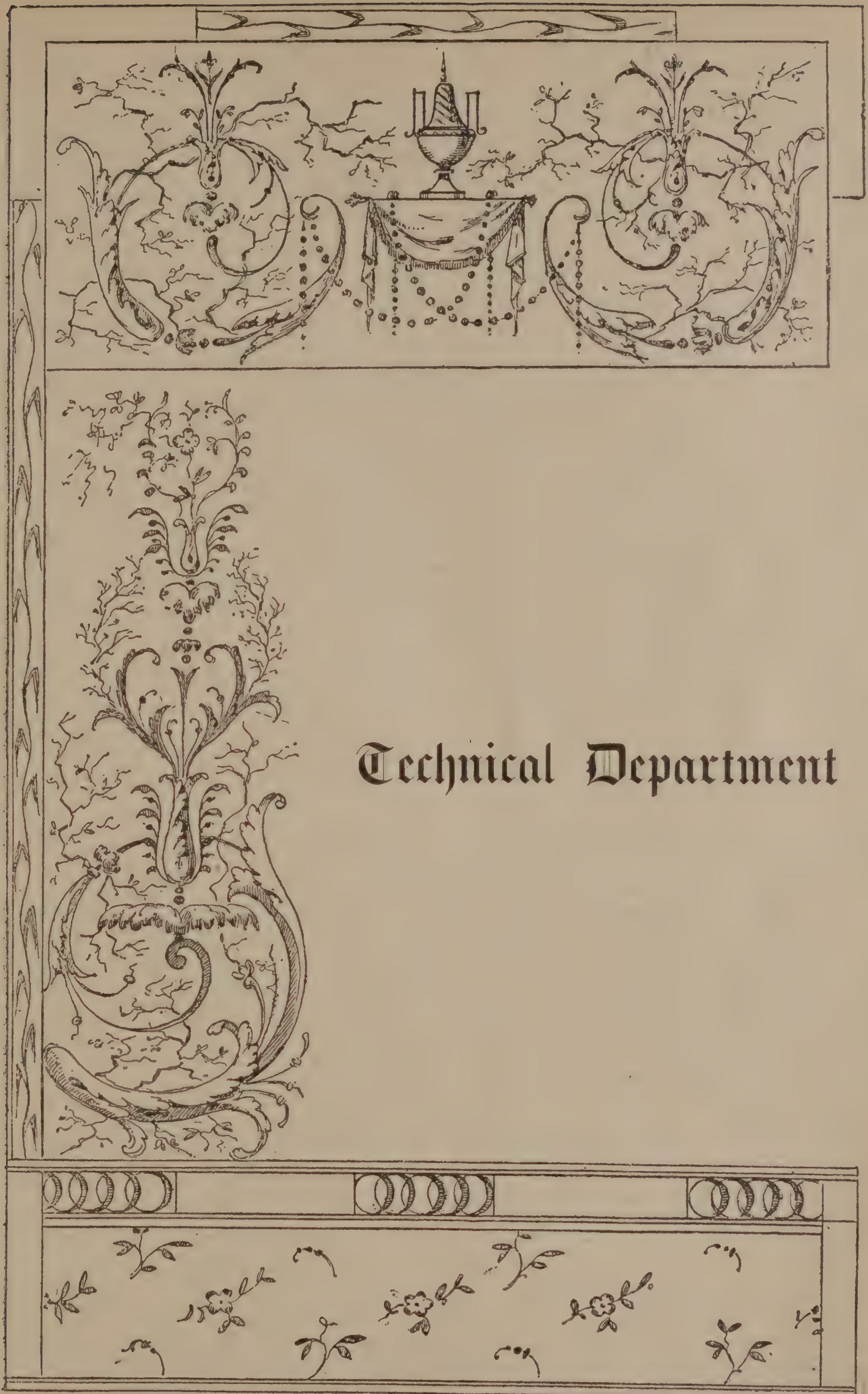
cornices, in the narrow streets of the Tuscan town, but with the details changed.

The buildings above-named are all in Florence, and their dates are not so widely separated that they need be distinguished as marking eras in Brunellesco's life. They were all built within twenty-four years; except S. Spirito, as above stated. With these was built the beautified Loggia of the Foundling Hospital (Spedale degli Innocenti), and that of S. Paolo, the first undoubtedly, the second possibly, by Brunellesco; buildings altogether mediaeval in form, except that the mouldings have been made to conform to classic types, and that the columns have a partly classical air.

In this manner the history of the European styles is told. The period covered is about twenty-four hundred years, that is, from 600 B. C. to the end of the eighteenth century. The number of buildings referred to is large, for very few of the 500 pages are given to general considerations or to broad sketches of the chief characteristics of the styles. As we have said, the author's plan is to proceed from one edifice to another, analyzing construction and decoration, with, of course, in later periods, some attention to the architects whose works are considered. Mr. Sturgis' appreciation is catholic, or perhaps we ought to say it is thoroughly impartial. In only one place has he allowed himself what may be strictly termed an expression of personal preference; we refer to the close of the chapter on the Byzantine style. Regarding the value of modern architecture he is thoroughly sceptical. He denies that architecture is even alive to-day as a fine art, and his remarks apropos of present conditions (p. 542) are not only well stated, but deserve to be pondered by those who are seeking a way out of the present wilderness of dead classicism and endless copying. The judgment shown throughout the book is eminently sane, so sound, indeed, that we are startled by the strong admiration expressed for the Caryatide porch, or Southern portico of the Erechtheion. This piece of work, beautiful as the sculpture undoubtedly is, must surely be regarded as the notable solecism in Greek architecture of the prime. It was a regretable misdirection of artistic effort. Few, we think, will join Mr. Sturgis in his wish that we had more of it.

The book is illustrated with 266 drawings and reproductions of photographs. The selection of subjects has been made with care to enlighten the text, and not, as is often the case, for mere pictorial effect. It is a pity, however, that the half-tone process was not more frequently used for exterior views of buildings. Some of the borrowed illustrations have suffered from over-reduction. These, however, are slight defects. They do not impair the immense usefulness of the work, which deserves to be studied and restudied by all who wish to familiarize themselves with the monuments of European architecture. This is now the best text-book we have in English, and, with a good collection of photographs, is an equipment for thorough and delightful study.

H. W. D.



Technical Department

BOSTON PUBLIC

ART WORK IN IRON.

THE ancients were remarkable for the character of their hand-wrought implements of warfare, their household utensils and their ornaments. It has been reserved to the iron worker of to-day to produce objects of art out of the metal in mass, and to weld it into forms of utility for structural adornment and construction. The architects of even so recent a period as a quarter-of-a-century ago little dreamed of the uses to which iron was so soon to be adapted, not only by mould, but by the skill of man's hand and arm. The magnificence of our modern structures, and the often boundless freedom given to the architect to produce good work, has enabled that creator of noble buildings to design the most delicate and also the most striking objects in both metal and stone. To what extent the former is used in these great constructions is shown in one of the most recent examples of architecture—the Manhattan Hotel, on the northwest corner of Madison Avenue and Forty-second Street, New York City. Architect Hardenbergh has been most successful in his treatment of the iron work in this noble structure, and his designs have been carried out by the JACKSON ARCHITECTURAL IRON WORKS, a firm that has acquired national repute for this class of work, in which it stands in the very front of its compeers. All the art metal work—as well as the iron construction—in the Manhattan Hotel has been accomplished by that firm, and those interested in fine art work in iron and bronze will find a study of this firm's work in the Manhattan Hotel well repaid.

A view of the exterior reveals to the observer a succession of iron window guards, conforming to, and carrying out the design of the carved stone panels. These are of wrought iron, all hand forged, and seem to merge into the delicate tracery of the lace curtains adorning the windows. The eye then falls on the handsome railings which run along the entire frontage of the hotel, and which are broken up with cleverly executed "grotesques," and capped in various places with clusters of lamps of ornate design. The balconies above are of attractive conception, while the balconies on the top floor form an unusual and remarkably effective skyline.

Passing on to the Ladies' Entrance, on the Madison Avenue side, we find a permanent marquee as a protection against the elements. This covered enclosure is one of the most interesting studies of its kind. It has handsome columns capped with lamps, the former being of open wrought iron work. To the north of the Ladies' Entrance is the Driveway, which is also a unique feature. Its doors are of massive oak with metal trimmings. Although weighing over 1,000 pounds each, these enormous doors can be opened and closed by a child, owing to the very nice adjustment secured by ball-bearing hinges—used for the first time under such conditions, and forming a most ingenious contrivance.

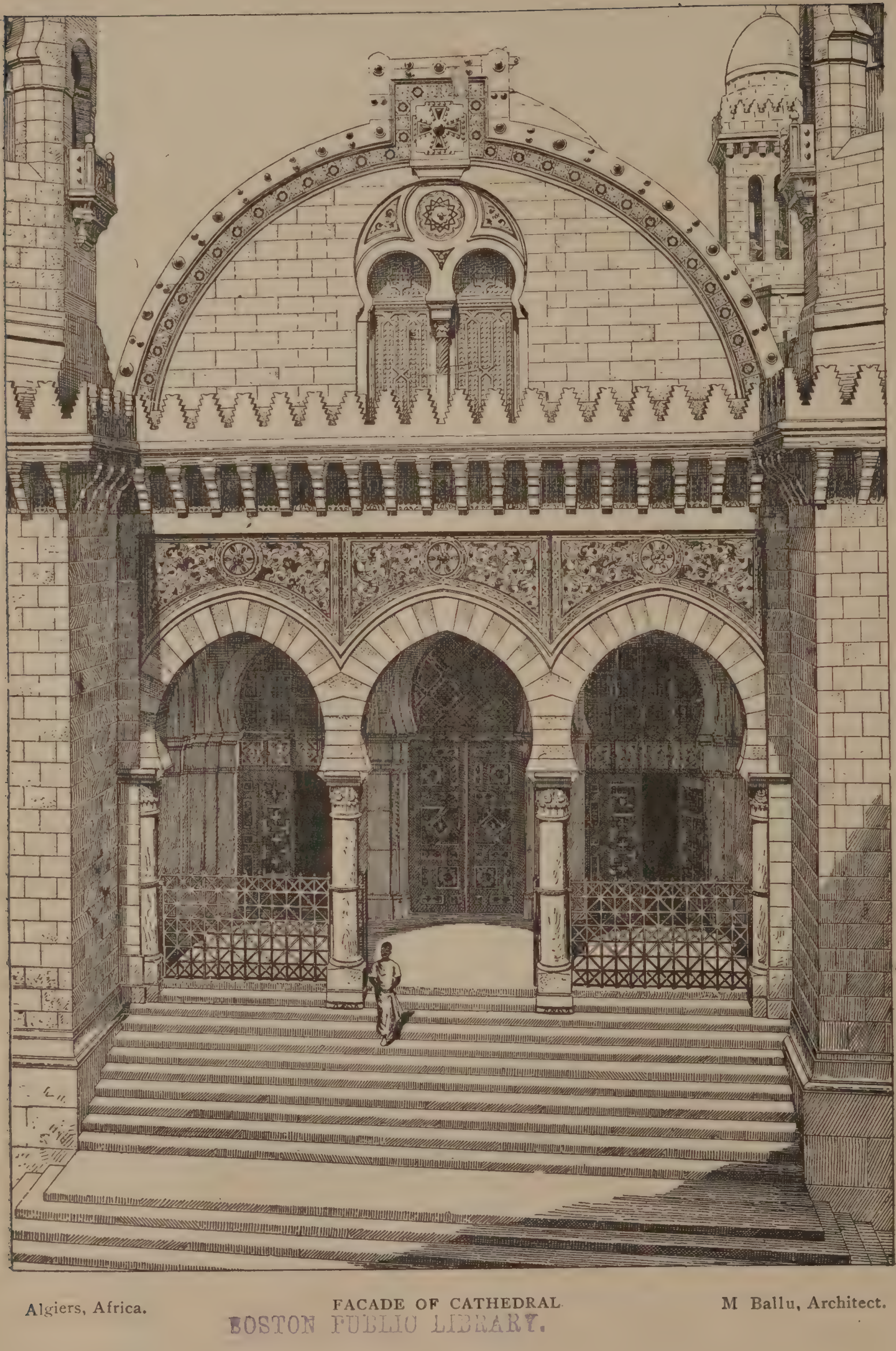
Returning to the Forty-second Street front we pass through the main entrance and come upon the beautiful and stately mezzanine, with its antique bronze balcony producing a striking effect. Underneath the mezzanine flat form appear the doors leading to the café and barber shop. These are in iron frame and beveled glass with a delicate art etching in the centre. We then pass on to the main entrance to the elevators, where we find a lavish profusion of ornamental iron work. The enclosures are handsomely and elaborately modelled in high relief, in Louis Quinze style, the doors being of very heavy construction. The sliding doors have the unusual feature that they move noiselessly and with ease, thus avoiding the incessant clatter so noticeable in many buildings. The panels of the enclosure are in duplex bronze and the general sharpness, good moulding and fine finishing of the castings are remarkable. Indeed these are features of the entire metal work in which the Jackson works seem to excel. The open grill work is also a feature, and also the elevator indicators in Louis Quinze design.

A noticeable improvement in elevator construction meets the observer in the heavy glass centrepieces framed in the elevator doors. In order to avoid the strong draft that would otherwise come through the open grill work, glass doors are built on the inside of the grill doors, thus practically hermetically sealing up the enclosures, yet enabling the guests to see when the operator of the car is coming to their floor and enabling him to see the guests. These glass doors can be swung open inwardly for cleaning purposes and can be unhinged in summer if required. They possess beauty as well as utility.

Ascending to the second floor we find the balustrade in polished antique bronze. Here the pleasant and agreeable effect of the grill work in the elevator doors is particularly noticeable. Passing to the end of the handsome corridor we come upon the enamelled iron elevator especially designed for the use of ladies, and running from the ladies' entrance on the Madison Avenue side, heretofore referred to, to every floor in the building. The sliding doors of these elevators are a feature. They are of a particular construction, designed to save space in the width. The ladies' stairway around the elevator enclosure on every floor is in enamel work to match the whole. This, by the way, is a cylindrical self-supporting stairway, carried entirely from the wall strings, and is a most interesting piece of construction.

The entire metal work done by the Jackson works in the Hotel shows the highest artistic skill. The Pompeiin bronze finish—" verdi antique," as it is sometimes called—is a noticeable feature, as well as the colors and finishes, particularly those in rose copper.

A glance at some important art work in metal may be seen in other productions of the JACKSON ARCHITECTURAL IRON WORKS. Among these are the exceedingly handsome bronze stairs and elevator enclosures in the Metropolitan Life Insurance Company's Building, on Madison Avenue and Twenty-third Street. These are carried out in a very delicate detail of enrichment. The iron work in the Progress Club, the Hoffman House and the library of the Elbridge T. Gerry residence is of a rich character and contains some of the finest examples of modern high-class metal work in both finish and construction. The Museum of Natural History contains some fine electro-plated work of the Jackson works, while the treatment of the bronze work in the rotunda of the Netherland Hotel is admirable. They also produced the stairs, elevator enclosures and all the ornamental and structural work in the Carnegie Music Hall; the massive iron work and stairs in the Produce Exchange; the bronze counter railing work in the Union Trust Company's building, and the massive hammered wrought iron gates erected for Mr. W. K. Vanderbilt, at Newport, designed by the late Richard M. Hunt. Among their recent work is that in progress on the New York Savings Bank building, the New York Athletic Club, the American Lithograph Company's building on Fourth Avenue and Nineteenth Street, and the American Surety Company's high structure, the last named showing an example of engineering of interest to engineers all over the world.



Algiers, Africa. FACADE OF CATHEDRAL M Ballu, Architect.

BOSTON PUBLIC LIBRARY.

The
Architectural Record.

VOL VI APRIL-JUNE, 1897. NO. 4.

WOODEN HOUSES IN SWITZERLAND.

VISITORS to the Geneva National Exposition of 1896 have had an opportunity to admire quite a large number of wooden buildings typical of those peculiar to the different Cantons of Switzerland—châlets for mountain, valley and plain, country houses, etc.—of various epochs, from the sixteenth century to the present day, all grouped together under the title of the "Swiss Village." The idea in the minds of the organizers of the Exposition was to give a sort of epitome of one of the most interesting, and certainly the most original chapters in the history of Swiss art—that of house building in wood—and it was important that visitors should have before their eyes a picture of the surroundings amid which former generations passed their lives, and should see what a thorough and charming sense of art, what graceful and picturesque originality, had been displayed by Switzerland in that architecture which is peculiarly her own. The "Swiss Village," therefore, was arranged on historical lines. Each house or châlet figuring therein exists, or did at one time exist, in reality; each has its date, its place of origin—in fact, its identity is fully established. These reproductions are absolutely faithful, not only the general plan and the mode of construction being exactly followed, but also the smallest details of the painted and carved ornamentation. The examples presented have been taken from almost all parts of Switzerland, and we find every architectonic form of wooden house, from the humblest and most modest, such as the little châlets (*mazots*) built high up on the mountains to shelter the cowherds in summer time, to the richest and most artistic creations in the way of carved and painted façades adorning châlets of the valley and of the plain, handsome inns, or dwellings of well-to-do farmers, such as the Châlet de Fischental or the Auberge de Treib. Everything is authentic enough to satisfy the most exacting of archaeologists. Imagination has been brought into play only in the grouping of the châlets and the arranging in a village—street, square, lanes, pump, etc.—of elements procured from all parts of Switzerland.

But the "Swiss Village" in the Geneva Exposition goes beyond the object which was at first contemplated. The idea was to reproduce a national feature, and we find that the bringing together of the elements of this historical picture has resulted in the revival of a style and the restoration to a place of honor of a mode of house-building which can be employed at the present day, thus resuscitating a variety of most agreeable architectonic forms. It is a natural album for the use of architects and artists, and we are inclined to believe that, the example now

Copyright, 1897, by THE ARCHITECTURAL RECORD COMPANY. All rights reserved.

having been given, we shall witness a renaissance of the art of woodworking. In Switzerland, architects have already begun to study the old models of châlets, and the modern edifices in course of erection (photographs of which will be given) no longer present those architectural absurdities that are embodied in certain fanciful châlets built during the last twenty-five years. By studying the faultless works of former times one gets a fuller comprehension of the fundamental principles of châlet architecture, all of which principles have their origin in the art of working in wood—in carpentry.

In America, where wood is such a favorite material for the construction of country houses, it is evident that the fact mentioned above, namely, that this art has its own principles and its own *technique*, is in too many cases forgotton or ignored. It would appear that architects are unable to cast aside the theory and practice of stone work and believe it is possible to produce the same effects with wood that are obtained from stone. Hence the ridiculous result that many of the country houses of wealthy people in the United States have colonnades and frontons, attics and porticos, treated *in wood.* This has been done and is still being done every day, and it is nothing less than an architectural heresy. It is a complete jumble of the most elementary principles of the building art. An architect who desired to reconstruct the Parthenon in iron would not be guilty of a graver error than this.

Another cause of the inferiority of wood architecture in America is the manner of placing the boards on the walls, the upper ones usually overlapping the lower. The certain result of this is to prevent any decoration of the fronts, and to produce, by the numerous lines of the revetments, a fatiguing effect which mars the appearance of the edifice. Besides, the joists are not visible and give no idea of the internal structure of the house. Furthermore, a proper use of wood is not made in the decoration of the interior. Nothing is better adapted for this purpose than wood, by its color, its grain, and the facility with which it can be ornamented, moulded and carved; yet in most cases it is sought to hide the material employed by means of papers and hangings, thus taking away the stamp and character of the building. Lastly, the deplorable custom which exists in the United States of painting the whole of the woodwork puts the finishing touch to it! All the houses are colored in some hue or other, and beneath this coating there might just as well be plaster, or brick, or stone. The effect is cold and commonplace. In Switzerland, on the contrary, where the woodwork is left in its natural color, being merely treated with refined linseed oil, the fronts of the châlets become bronzed and take various shades as the years go by with their showers and their sunshine, and they acquire an exquisite patina which makes each habitation a living thing in harmony with its surroundings and its climate.

In Switzerland, too, and the other countries where the woodworking art has flourished and created a style, instead of masking and hiding the material employed, every effort has been exerted to make the most of its decorative properties; hence the joists are exposed, the projections of the upper floors emphasized, and the joints left uncovered; the roofs are developed and the eaves extended, protecting the house and producing the finest decorative effect imaginable with their supporting brackets. Inside, wood forms are the basis of the ornamentation, the walls are wainscoted and the beams are left visible in the ceiling. This is the natural and logical decoration of a châlet. Following in this way the most simple and the most evident principles a style of architecture has been created which is full of grace and originality.

Before giving a detailed description of the different types of châlet, it is necessary to furnish a little general information as to their dates and history. The art of building in wood has flourished in Switzerland to a special extent since the sixteenth century. The finest specimens of wooden edifices belong to the seventeenth and eighteenth centuries. The châlets of those periods are those which have the best ornamentation and present the most perfect styles. The farmers' chalets of our own day are not so rich, nor in such impeccable taste. It is for the edifices of the upper classes to continue the sound traditions of the last century. All the elements exist, and architects have the opportunity to make a close study of the most perfect models. It would be unpardonable to copy the errors of our predecessors and be content merely to get somewhere near the mark.

There is another interesting observation to be made upon the style of decoration illustrated in châlets. We have here an art which flourished in the sixteenth, seventeenth and eighteenth centuries; that is to say, during the period when, in stone architecture, the ornamentation borrowed from the antique Roman was, through the neo-classic Renaissance, at the height of its glory; when the study of ancient bas-reliefs and monuments led Italy, first, and then France and the rest of the civilized world, to abandon the architectonic and decorative styles evolved by Christian and feudal Europe, in order to resume a tradition long dead and which had been beautiful and brilliant only because it was the natural and legitimate outcome of a special society and a special civilization. At that period, when the craze for the uncouth and the *rococo* sprang up (it endures still), wood architecture had reached the fullness of its growth, and its efflorescence was in no wise modified by the strong current which carried Europe towards the antique. On the contary, the woodworking art has conserved the traditions of the Middle Ages and we are able to see on the fronts of some of these châlets, perpetuated for our delight and wonderment, the arabesques and palm branches, the roses and the flower-work, created by the inventive fancy of the masters of that period. We meet with some very curious survivals, showing how the trades' corporations have clung to their traditions and defended them against the learned innovations of the architects. Even in the masons' trade we see how the existence of the Gothic arch has been prolonged long after the resurrection of Vitruvius radically modified the principles of architecture. In the woodworking branch this resistance has been complete. The carpenters have repelled all attacks made upon the traditions handed down to them by their ancestors. They have realized that they exercise a special art, with its own principles, requirements and beauties, and also its own limits. These principles have been developed by them and carried to their full conclusion, and, remaining thus faithful to themselves, they have attained a genuine architectural style.

Even if one is only slightly acquainted with the early Romanesque decoration, one cannot fail to see the resemblance thereto of some of the motives met with in the Swiss châlets. And if one has studied the origin of the Romanesque style and traced its roots in the industrial arts; if one has examined the earliest manifestations of carpentry in Norway and Sweden—all that distinct and very original decoration revealed in the doors of certain churches constructed in wood—one cannot have helped noticing the large part which wood decoration, in a word the carpenter's art, has played in the formation of the Romanesque and Gothic styles. This influence is undeniable, although it has been studied by very few. People who have examined those primitive examples of woodwork must have been struck by the very oriental character of some of the decorative motives. In some of the twine and rosework there is clear evidence of our common oriental origin, and it is not one of the least subjects for astonishment to find that civilization did not spread solely by way of the Mediterranean basin, but that traditions and a certain current of art traveled directly from the East to the North.

It is thus to Romanish art, to the

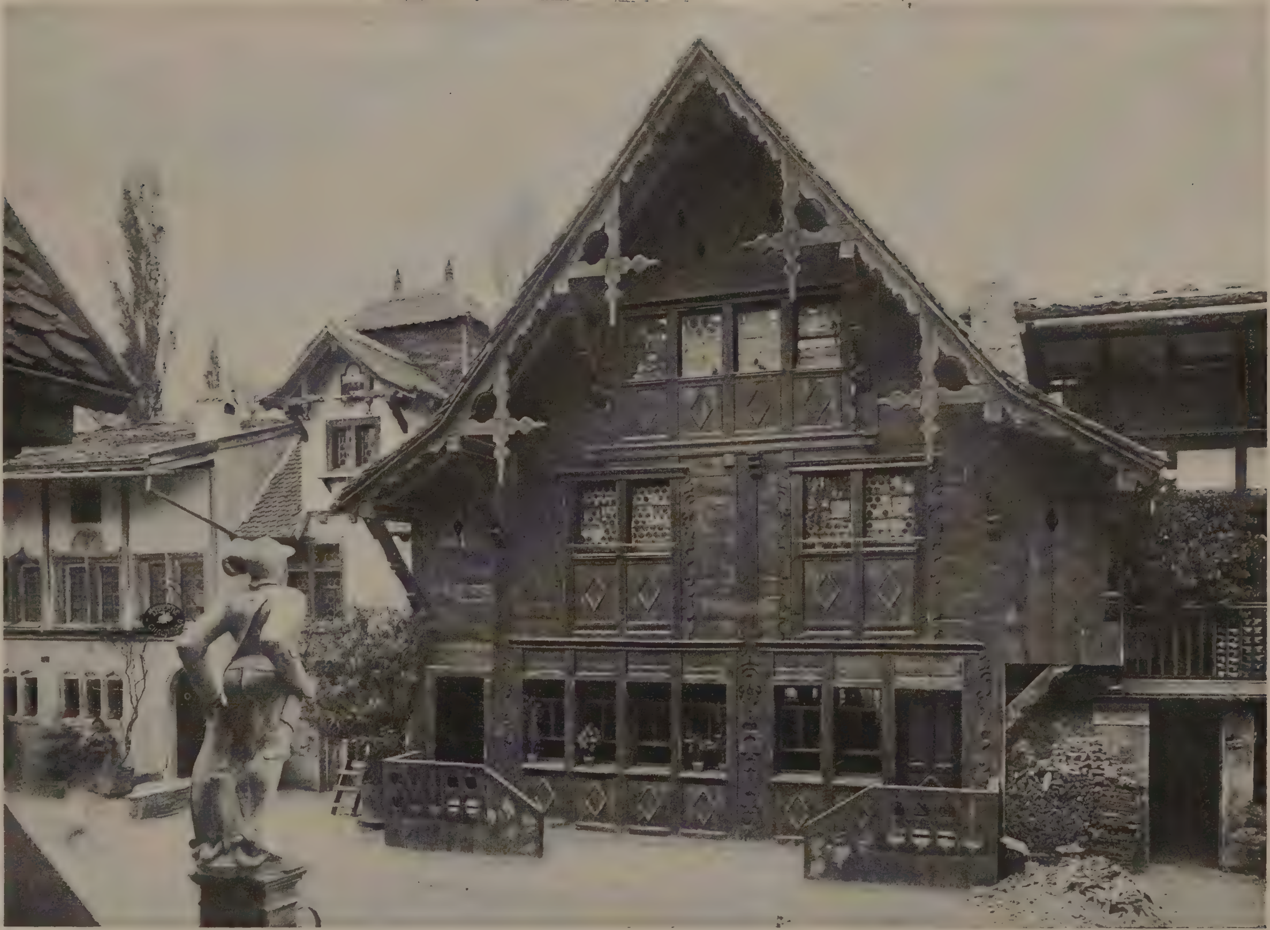


FIG. I.—CHALET DE FISCHENTHAL.

BOSTO
PUB
LIBR

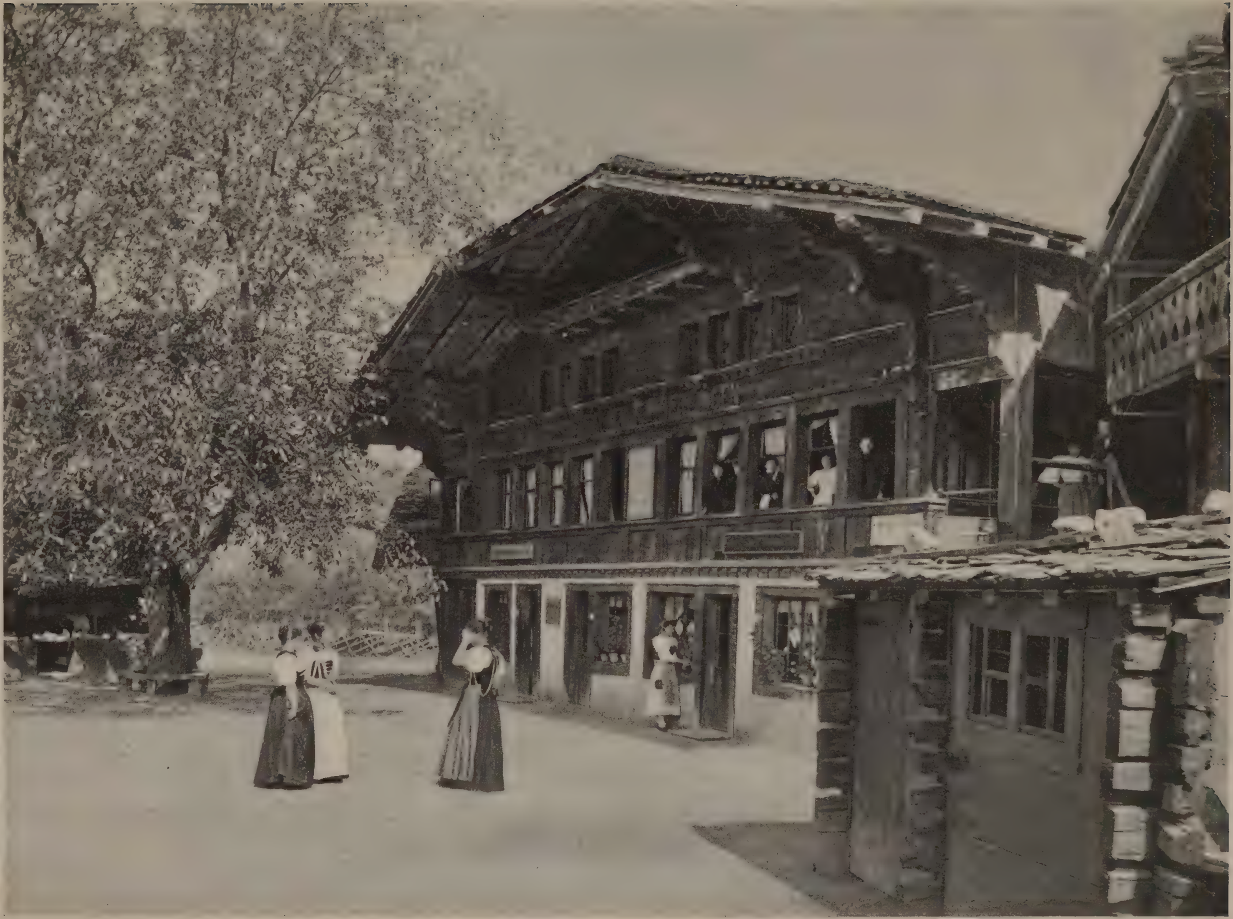


FIG. IV.—CHALET DE BERLINGER, A. D. 1750.

BOSTON PUBLIC LIBRARY

art of woodworking as practiced in early times in the North of Europe, and, if we wish to go back still further, it is to the East, that we must look in order to find the origin of the ornamentation that subsists to-day upon the fronts of our châlets. These are sound and authentic patents of nobility for Wood Architecture. Our carpenters have been unconscious of the high antiquity of the traditions of their calling; but they have performed their task with earnestness and candor; they have pursued a good and ancient craft, and it is legitimate, even in an ephemeral review article, to say so and render them this homage.

* *

Let us now deal with the practical and technical side of our subject. Varied as are the châlets found in Switzerland, they can nevertheless be comprised within three principal classes, to wit: the châlet of the plain, the châlet of the mountain side or of the valley, and the châlet of the heights. We will give two or three examples of each of the first two classes, but will limit ourselves to one châlet of the third class. The last-named type is not suitable for us, whereas in the other categories there are numerous specimens that could be copied by us and adapted to the requirements of contemporary life; in fact, there is a large series of edifices in exquisite taste which would furnish country houses thoroughly habitable and of pleasing aspect. In a future article we shall treat of the technical side of châlet construction in Switzerland, giving the methods followed *at present* and the cost of erection.

The *roof* will assist us in classifying the châlets. It is modified in a very interesting manner according to climate and altitude. If the climate is a wet one, the roof is made higher and steeper; the gable is raised and brought forward to shelter the front, while the steep slope of the roof causes the rain to run off rapidly into the gutters instead of remaining on the thatch-planks. The fine Châlet de Fischenthal (Fig. I)* affords a perfect example of this kind of roof. It is scarcely necessary to draw attention to the extreme gracefulness of this roofing, nor to the elegance and style which it imparts to the entire edifice; but it should be noted that not only is its silhouette charmingly picturesque, but it is the sole logical and rational roof for a certain kind of temperate climate—the Swiss, in fact. The greater number of châlets of the plain are covered by high roofs of this sort, recalling the beautiful roofs of the Middle Ages which the French sixteenth century has handed down and was able to combine, for a time, even with the principles of construction of the Renaissance. We lost a great deal, not only in grace and picturesqueness, but also from the point of view of comfort and durability, when we abandoned this system and replaced it by flat roofs, and often by galleries after the Italian fashion.

Fig. III. shows another admirable specimen of these large roofs, which seem to envelop the house protectingly. It belongs to a house at Stanz. The façade is constructed in bays of joists bricked in and covered with plaster, so we are here only on the border land of wooden buildings. The roof, however, is typical, being quite that of a châlet. The line of the main roof is broken; it is inflected so as to cover the staircase and the external gallery; at the summit the gable-end is cut off, in order to avoid the too acute angle which would have resulted from the meeting of the two ascending lines. This ingenious arrangement is very frequent in wood architecture. The reader will remark the large mass of the dormer window. True to the principle enunciated above, the architects in wood have never sought to deceive by hiding the organic parts of the building, but have preferred to let them stand forth in all their picturesqueness. It should be noticed, too, as we have an illustration before our eyes, that the chimney is provided with a board, which is intended to be upraised on one side or the other according to the direction of the wind. Before finishing with this house, we must not omit to say a word about the beautiful aspect of its front, with all its framework in full view, its exposed beams adding to the architectonic effect, and of its window-frames and roof-brackets, which appear in all their solidity, to the advantage of the general effect. We see here a most successful application of those principles that constitute the beauty and elegance of wood architecture. However, we shall deal in detail with each of these points, and for the present only wish to show one or two of the best specimens of high roofs, which are to be met with in places where rain is more often to be expected than snow.

---

*We give here, after the Chalet de Fischenthal, one of the most elaborate types of chalets of the plain, a mazot, simple and primitive chalet of the heights, which is only in use during the summer and which needs no more detailed description. (Fig. II.)

On the other hand, in spots where there is much snow the roofs are entirely different. Instead of being built so as to throw off the snow, they are flattened in order that it shall accumulate on the house, for a thick layer of snow protects the dwellings from the extreme cold just as it shields the seeds in the earth from the very hard frosts. Thus the roofs are flat and low,and are usually covered over with shingles,the beams projecting beyond the house and forming a sort of ledge on which the snow rests. They certainly have a less picturesque effect than the high roofs, but they are indispensable in certain climates—in the mountains, the upper valleys, etc. We give an illustration of one of these in the Châlet de Berlingen, Canton de Thurgovie (Fig. IV.). The gable in this case is also cut off, and the roof projects nearly two meters. Compare the horizontal lines of this roof with the almost vertical ones of the Châlet de Fischenthal. The two systems are totally different.

At this point we will make a halt with the rich and handsome châlet of the valley—that of Fischenthal, for instance, which is one of the most perfect types of wood architecture. This châlet was built in 1785 for some well-to-do farmers in the Canton of Zurich. The "Swiss Village" contains a reproduction of the front and roof, and it is from this double point of view that we shall examine it. It will tell us a good deal about the principles of house-building in wood and about the decorative effect aimed at and which is only obtainable from that material.

We have already spoken of the roof as regards its height and steep slope. Fig. V. gives a three-quarter view of the châlet, showing the roof under a new aspect. One can form an idea of how it juts out over the façade and how the house seems to take shelter beneath it. In the "Swiss Village" the châlet has a frontage of 27 feet, and the roof projects a little more than 4 feet. It is to the steepness and the overhanging of the roof that the châlet owes its admirable state of preservation. Wooden constructions require that their front and lateral walls should be protected from the inclemency of the seasons; hence the extension of the roofs, a feature from which the ingenuity of the architects has managed to obtain such picturesque effects. In front (see Fig. 1) the roof is sustained by large brackets, which are sufficiently massive to contribute to the general effect of the façade, and we see once more how it is in the very nature of wood architecture to throw into relief all the frame-pieces of the edifice and utilize the same for the decoration. The roof is further supported by pendentives of handsome design, resting on the brackets. These relieve the monotony of the ascending lines and give the entire building a stamp of elegance.

The façade itself tells us unequivocally all the secrets of the construction. The whole framework of joists is vertical, and, of course, visible. Between the beams the boards are placed one overlapping the other. The façade is entirely composed of these ascending lines, broken by the window frames.

We touch here upon one of the points on which the wood-builders

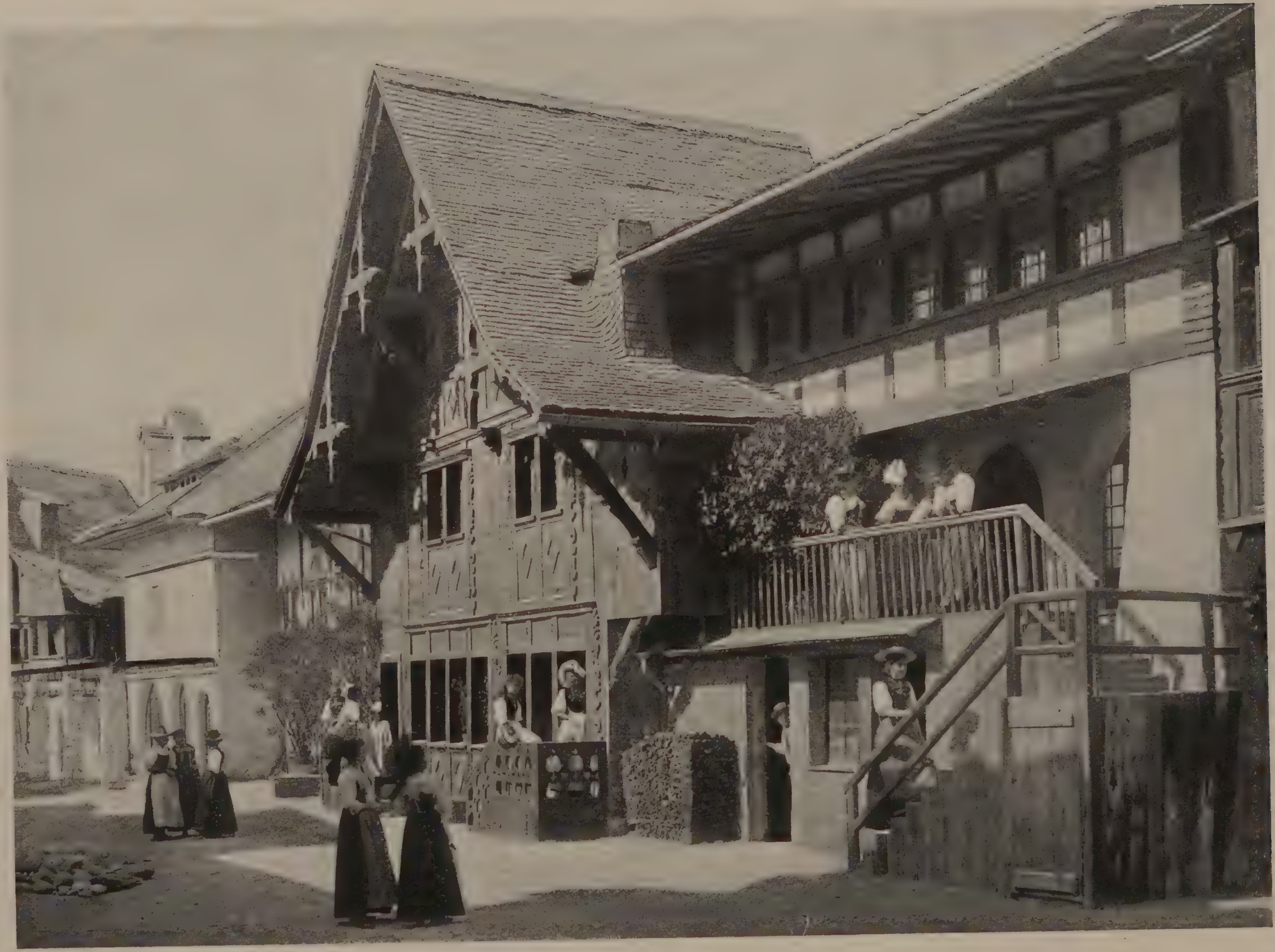


FIG. V.—CHALET DE FISCHENTHAL.

BOSTON PUBLIC LIBRARY

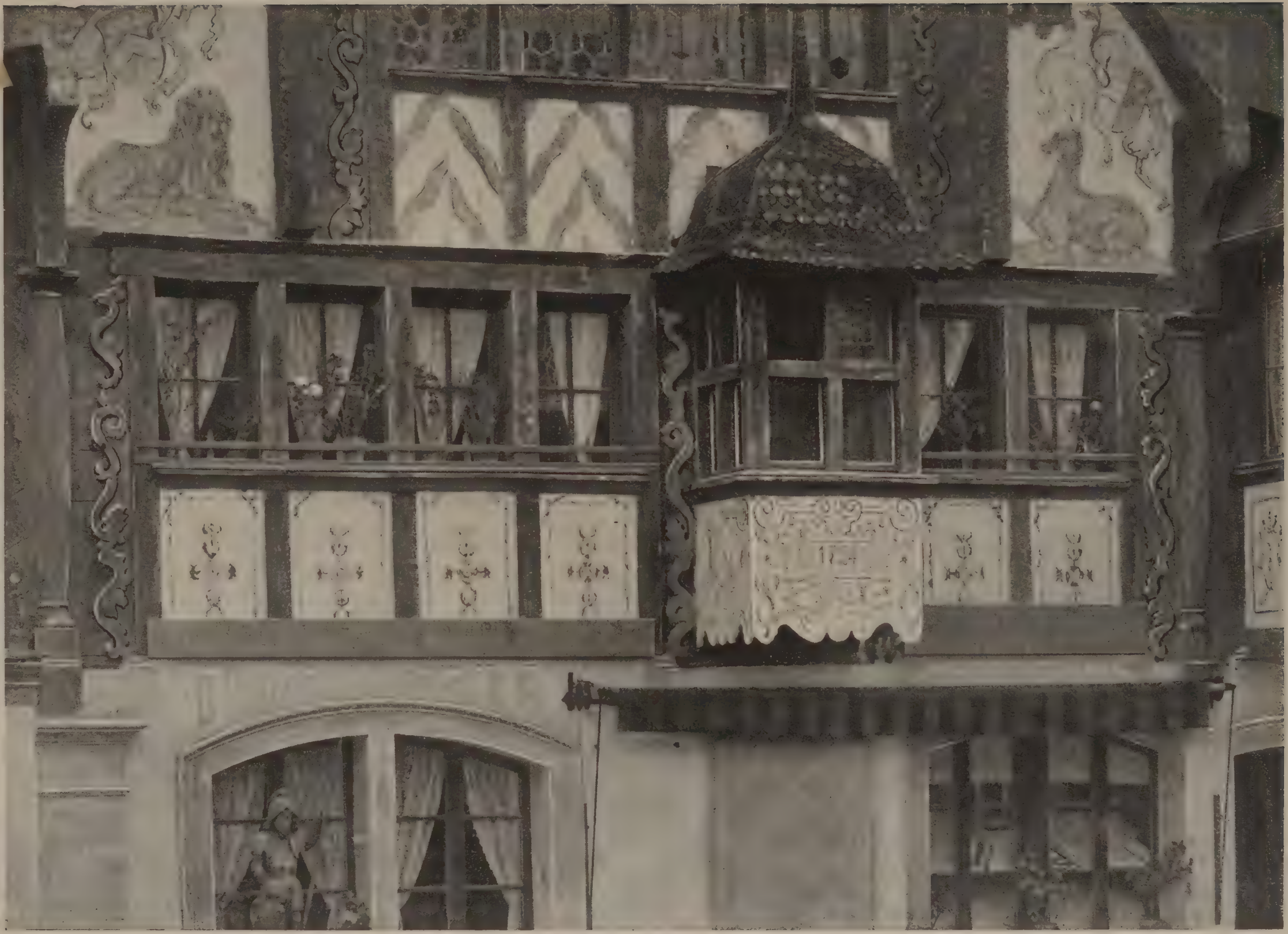


FIG. VI. —DETAIL FROM CHALET DE STANZ.

BOSTON PUBLIC LIBRARY

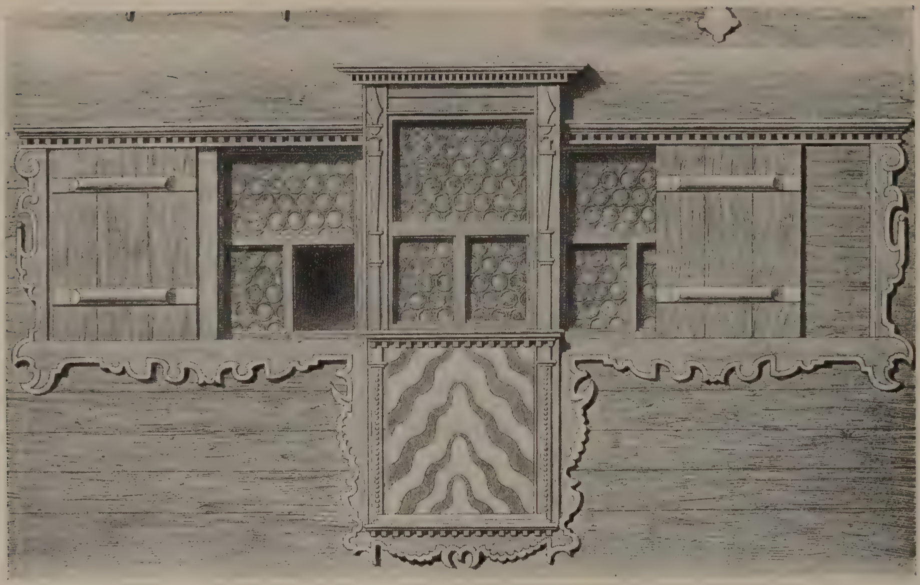


FIG. VII.—DETAIL OF CHALET WENDOW.

have displayed their taste with the greatest success. They have deeply studied the matter of windows; they have employed divers forms; they have made them double and triple, united in a single frame, and have produced some charming varieties. In the course of these articles we shall show a number of examples. These windows rarely appear singly; mostly they are double, and very often triple and quadruple. The reason of this is found in the arrangement of the châlet, which usually has only two floors, and with low ceilings it is not admissible to have high and wide bays, whereas a series of little connected windows has a most pleasing effect from the inside.

It is to be noticed also that symmetry is scarcely ever aimed at, although it is considered by our architects to be an absolute necessity. In the finest châlets the place and grouping of the windows have been decided by fancy and personal taste, and one cannot help recognizing that the graceful freedom of our forefathers has done more to make the window a decorative feature of the façade than could ever have been obtained by an inflexible adherence to the principles of the architects.

One other characteristic of the window in wood architecture is found in the Châlet de Fischenthal, namely, the prolongation of the frame. It does not merely surround the window, but extends below it as far as the floor, thus giving it a larger place in the *ensemble* of the façade. The panel enclosed by the frame below the window is generally decorated. In the present instance this decoration consists of a lozenge, which is repeated beneath each window.

Lastly, the frame itself demands some sort of decoration, and in châlet architecture the frame-motives have furnished ornaments admirable in style. We need only cite the frames belonging to the Châlet de Fischenthal and those of the Maison de Stanz, of the latter of which we give a separate illustration (Fig. VI.). Here we have, not merely efforts more or less happy, but a complete art that has attained its full expansion and the full mastery of its effects.

Fig. VII. shows a delicious set of low

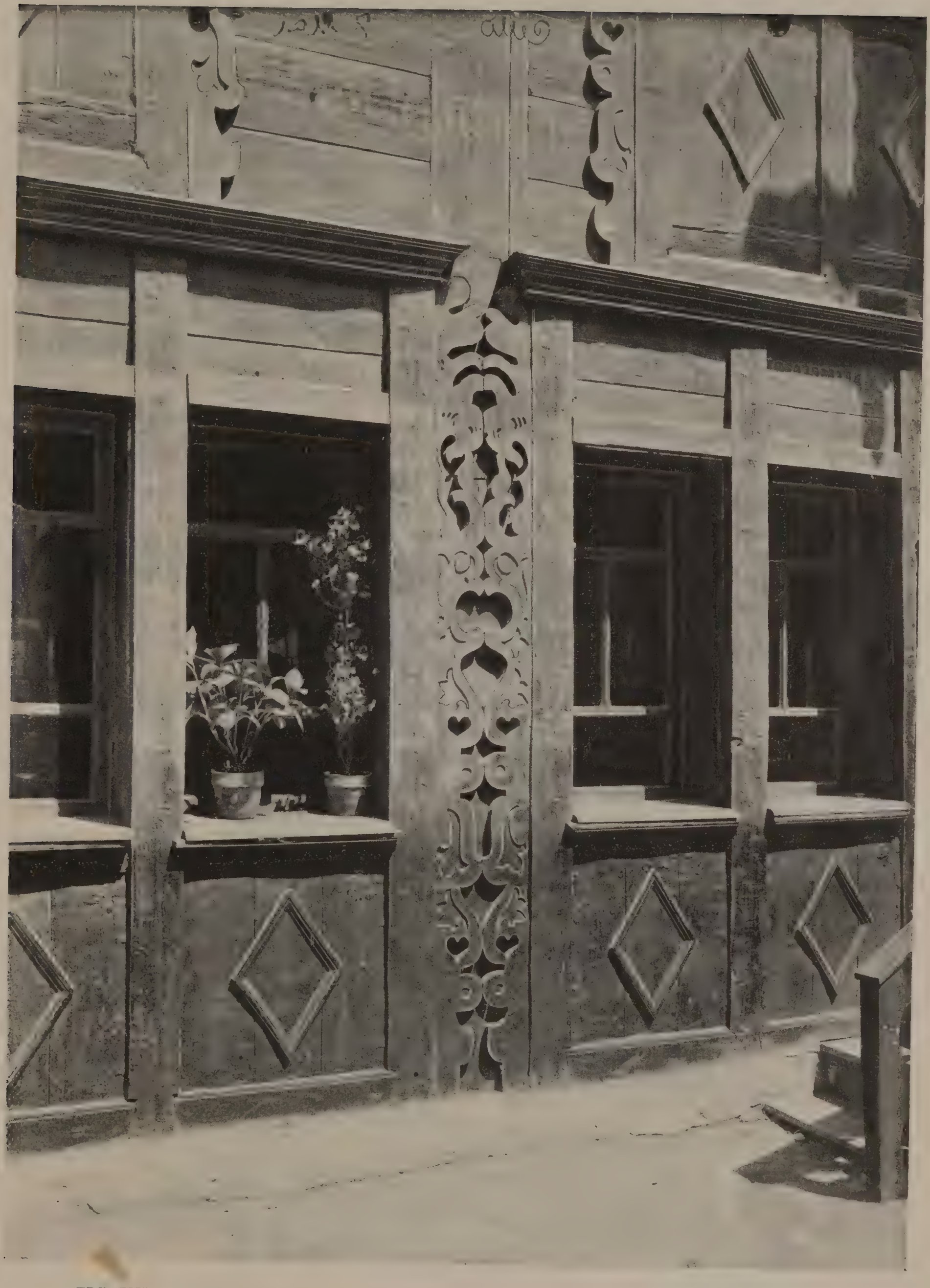


FIG. VIII. —DECORATION IN CARVED WOOD—CHALET DE FISCHENTHAL.

BOSTON PUBLIC LIBRARY

windows taken from a châlet in the Canton of Appenzell. It is after Varin's well-known work. We propose to give other models of windows with overhanging ledges, which will be found equally charming.

Our last illustration (Fig. VIII.) shows one of the best specimens of carved woodwork. It is the foliage on the ground floor of the Châtel de Fischenthal, which separates the two groups of windows. This ornament, owing nothing to the ancient classic, has that special beauty which was attained in the most exquisite works of medieval decoration.

The wood used in the construction of the Châlet de Fischenthal is deal. It was left in its natural state and probably merely treated with linseed oil. It has, therefore, a beautiful reddish brown patina to which each passing year adds an additional mellowing touch.

Jean Schopfer.

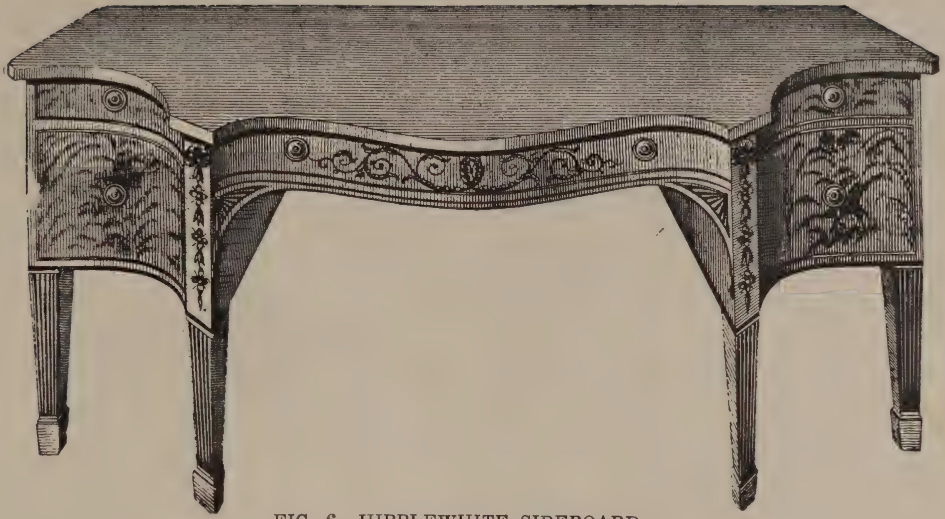


FIG. 6.—HIPPLEWHITE SIDEBOARD.

CHIPPENDALE FURNITURE.

WHENEVER furniture is the subject of conversation it will not be long before the name Chippendale is introduced. It seems to have a peculiar fascination for the tyro in furniture lore and often his sole stock in the names of prominent furniture makers. Usually there is a more or less definite idea of some style or kind of furniture with which the name is associated, even among those least informed on the subject. In a general way every one on hearing the word Chippendale calls to mind some article of furniture he has seen either in the shops where "antique" furniture is sold or in the house of some friend who has a "Chippendale room." Such a piece of furniture they recollect is of mahogany, and, perhaps, has claw feet, but further than this no definite idea of its detail is fixed in their memory. The term is used so regardless of its proper application that those who are familiar with styles are in doubt whether the speaker is applying the word correctly or not. And to those who do not understand the differences in furniture styles the word includes almost anything that is old-fashioned.

The most common misuse of the name is its application to sideboards, and this is encouraged by many dealers in furniture who know better but thereby avoid dispute and make a sale.

It is the endeavor of this paper to explain what are the characteristics of Chippendale furniture, and the differences between it and the nearly contemporaneous makes with which it is confused.

In the second half of the seventeenth century what is known in architectural arts as the Rococo style began to exert its influence in all civilized countries. At first the purer and simpler forms of the Renaissance were mixed with those of the new style, but finally the greatest freedom of treatment prevailed, everything taking the most fantastic forms and combinations.

In Rococo work there is a prominence of ornamentation, and an entire disregard of constructive principles. The lines are curved in the most varied manner, for no particular reason; all straight lines are avoided. The most characteristic ornaments are scrolls, shells and garlands of fruit or flowers.

Rosengarten says: "During this period the deterioration of architecture and taste went hand in hand with the contemporaneous unnatural fashion of wigs and the senseless want of taste in the employment of pigtails and powder; and a certain affinity between the architecture of the seventeenth and eighteenth centuries, and the method of dressing the hair which then prevailed has led to the expression 'pigtail and periwig style' being employed to describe the period under consideration."

This style of work was almost universal. It was better carried out in France, where it characterized the work at the time of Louis XV., than elsewhere.

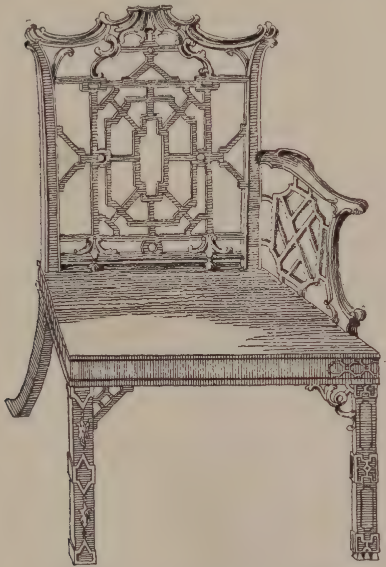


Fig. 1.—Chinese Chair—Chippendale.

In other countries the details are coarse and less refined. Paris was the model for imitation throughout Europe, and except for the local influences the Rococo style became universally the same. England did not escape the fever for the French style, though, perhaps, it did not accept it as early or adhere as closely as some other countries.

Some years before the Rococo period was replaced by a new style, an English book known as the "Gentleman and Cabinet Maker's Directory" was published. This was by Thomas Chippendale, and was printed in 1754.

Chippendale was a carver, who undoubtedly learned the trade from his father, a maker of carved furniture. The book of sketches he published is one of the earliest (perhaps the earliest) of books on furniture in the English language. This, together with the fashion for old work, has much to do with our associating his name with a style of furniture which surely he did not invent. Styles are never invented; they are due to a slow development, step by step until fully evolved. Where,

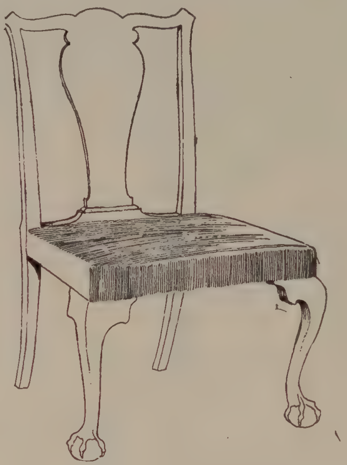


Fig. 2.—Type of Chippendale Chair.

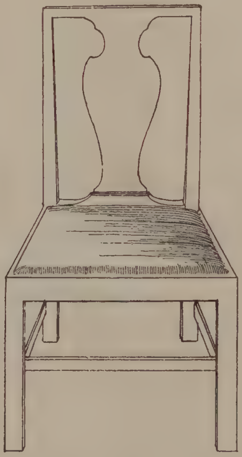


Fig. 2a.—Simple Chair by Chippendale.

then, did he receive his inspirations, if we may call them such? He lived at a time, as we observe, when the Rococo period was drawing to a close, but his father worked at the furniture trade when the French craze was at its full height. His son's apprenticeship probably was devoted to Rococo carving almost exclusively.

Interested, as he may have been, in the French style, ample opportunity was afforded both by examples and publications for him to study the forms. But when conducting a business for himself there were other influences which were felt, and not the least among them was that of money. He undoubtedly made anything that "would sell" or that fashion dictated, and fashion in England at that time called for things that were Chinese. Sir William Chambers, an architect, who had traveled in China, introduced the fashion, and it was soon adopted by the furniture makers of the times. Many articles had been brought to England from China, and they were used as models by Chippendale, and others of his time, who introduced Chinese forms into the carvings of their furniture. Such forms were no more out of place than many of the other meaningless shapes employed. How furniture of this character was to be used he explains in the table of contents of his book, thus: "Nine designs of chairs after the Chinese manner, and are very proper for a lady's dressing-room. They will likewise suit Chinese temples." (These latter were little garden houses built on English estates at that time.) "They have commonly cane bottoms, with loose cushions; but if required, may have stuffed seats and brass nails." Chippendale also mixed with ornament forms taken from the Gothic period, and produces what he called "Gothik" furniture. We may claim, then, that Chippendale furniture belongs to the decline of the Rococo period, and that it is a mixture of French forms, with ornamentation adopted from the French, Chinese, and occasionally other styles. It remains for us to see what are the particular features which characterized his work. We shall at the very outset find a difficulty. Chippendale had many contemporaries, who worked in exactly the same manner, so it will be almost impossible for us to say that any particular detail was used by him exclusively.

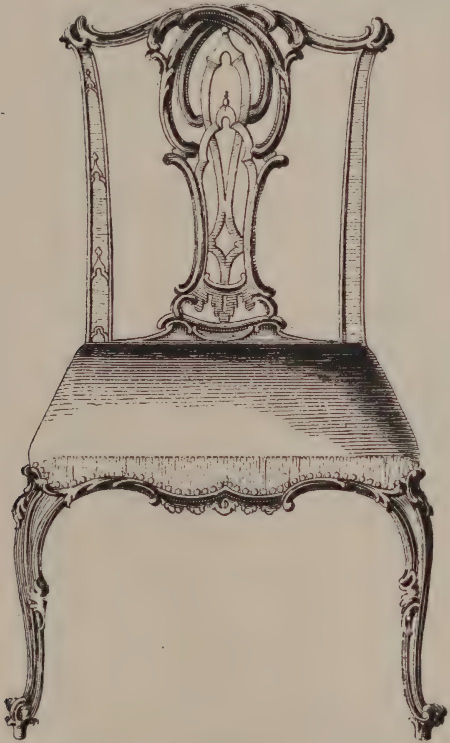


Fig. 3.—A Chippendale Chair.

There are, however, forms employed by English furniture makers of that time which may be called "Chippendale," as he is the best known to us among them. If we examine the designs and examples of the chairs which are preserved to us, we will notice that if the ornament is omitted, so they are reduced to lowest terms, there is a similarity of design in nearly all. This is what may be called the type of the Chippendale chair. It is only a question of adding ornament to this form to produce his most elaborate design. The ornaments he employed are principally those common to all Rococo work, with the addition of Gothic or Chinese

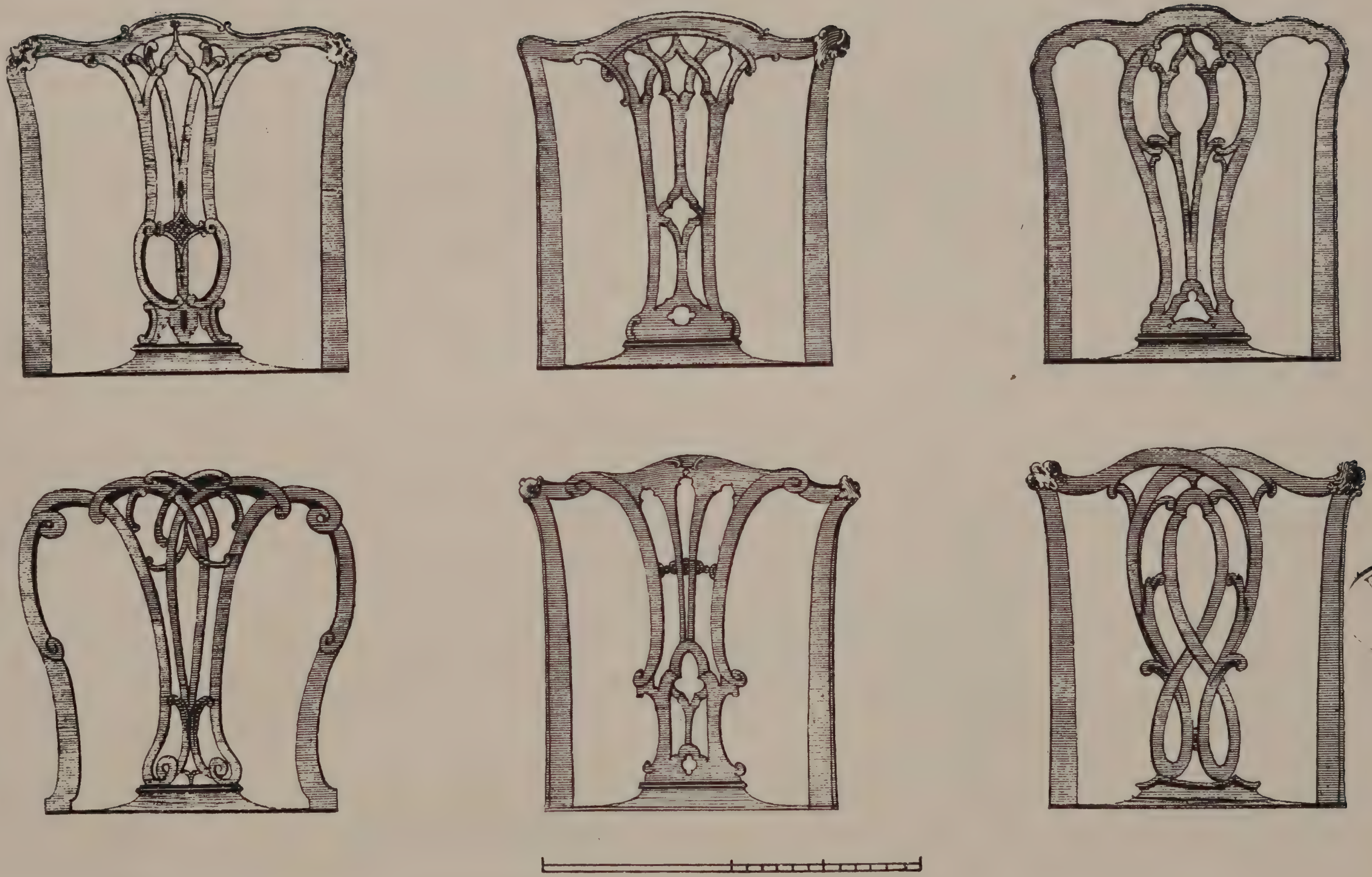
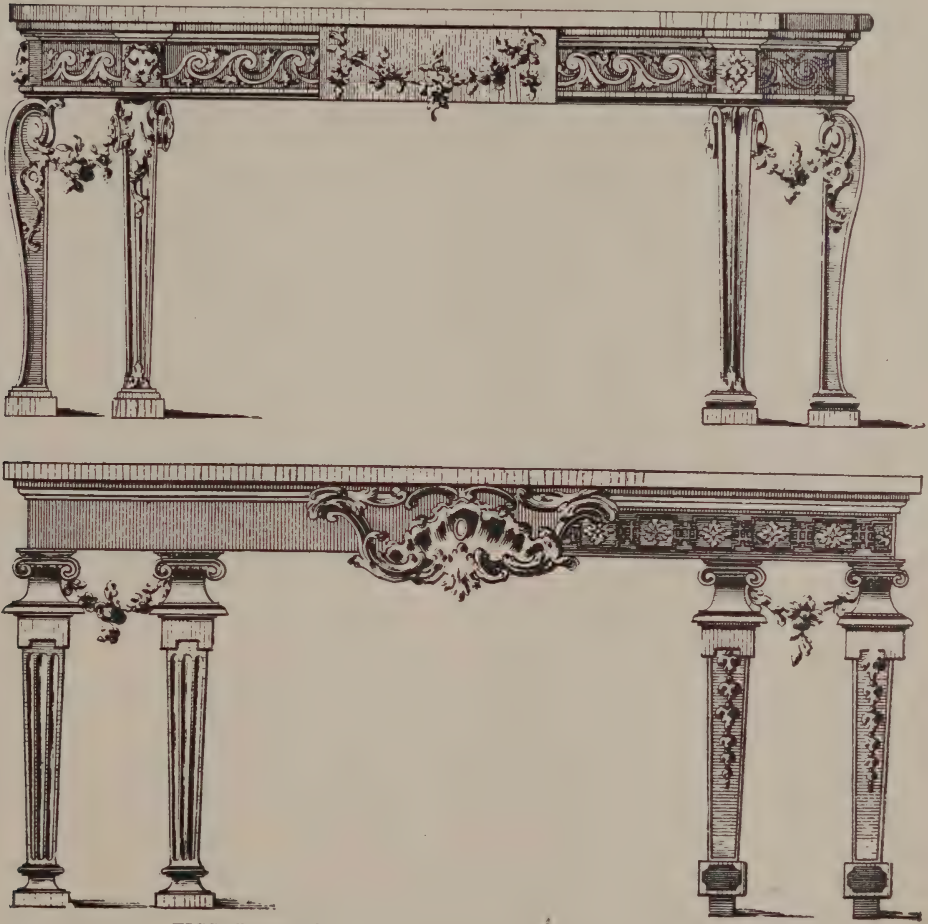


FIG. 4.—THE BACKS OF SOME CHIPPENDALE CHAIRS.

BOSTON
IC

shapes. The Gothic feeling is found often in the perforations of the chair back, where we see a resemblance to the form of a cusped, pointed arch. Sometimes there is a surface decoration like the profile of a series of small Gothic finials. This is what he did when making a chair without striving to produce a particular style. In those shown in his book under the caption of "Gothick Chairs," we find less of the Rococo ornament, with more of that sawn perforated work representing trefoils, quartre-foils, and lattices, which are believed by many to typify Gothic ornament. But even in these chairs he has not been able to avoid introducing a little of other ornament.



FIGS. 5 AND 6.—CHIPPENDALE SIDEBOARD TABLES.

The chair leg which Chippendale seems to have preferred was the bandy leg, usually ending with a ball and claw foot. It is strange to note, however, that not one of these simple claw-foot forms is shown in his book, all the designs there being more elaborate. He did not use exclusively the curved leg, for we find chairs, tables, etc., with square legs, the same size throughout their lengths, and others which taper towards the foot. The turned leg does not seem to have been much used. The shaping and ornamentation was also confined to the front leg, in most instances the back leg being square.

We know that mahogany was not the only wood used by him, for in describ-

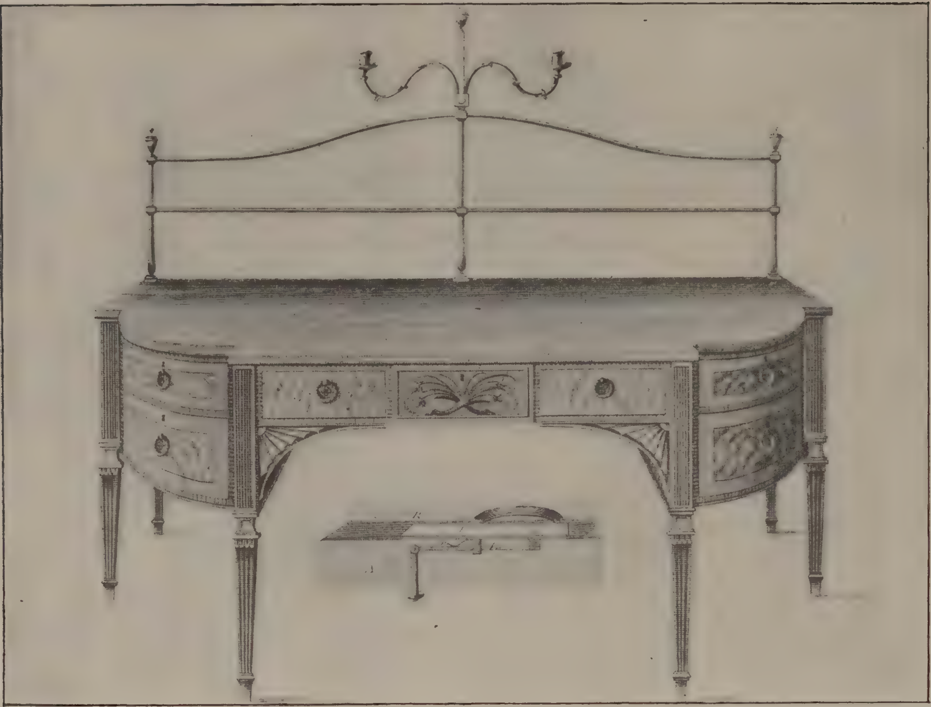


FIG. 7.—SHERATON SIDEBOARD.

ing the drawing for a dressing table he says it was "made of rosewood, with gilt ornaments." And speaking of a library table, he says, "the ornaments are intended for brass work."

His book contains a great variety of designs which were never executed, and some of his critics (as he states in the preface of the third edition) said many were "impossible to be worked off by any mechanick whatsoever." He resents this and claims that "every design in the book can be improved, both as to beauty and enrichment in the execution of it."

Chippendale not only made chairs, but almost everything in the furniture line, except the one article with which his name is most frequently associated to-day. We refer to sideboards. It is doubtful if he ever made a sideboard. In his book there is no reference to sideboards, though there are several large tables which he calls "sideboard tables." Though the word sideboard was used long before his day, it is probable that the early English sideboards were merely tables.

In 1787-91 Hepplewhite & Co.,English cabinet makers, published a book of designs. Among them are those for sideboards, with a deep drawer at each end, and a long shallow one in the middle. They also published in the same book four designs of sideboards of the table form, without drawers, similar to those shown in Chippendale's work. In the preface of Hepplewhites' book are the following remarks: "Sideboards.—The great utility of this piece of furniture has procured it a very general reception, and the conveniences it affords render a dining-room incomplete without a sideboard. Of those with drawers, we have given two designs. They are often made to fit into a recess, but the general custom is to make them 5½ to 7 feet long, 3 feet high, from 28 to 32 inches wide."

It was a sideboard similar to these (that is, a Hepplewhite pattern) which was placed on exhibition recently in a collection of colonial relics and was noticed in the newspapers as "a mahogany Chippendale sideboard, 200 years old!"

Hepplewhites' mahogany work is usually severely plain and the legs square, tapering towards the bottom. The ends of these sideboards may be square or rounded, and the front swelled out, straight, or curved in. They are most often of mahogany, and almost invariably inlaid, though carving is not excluded. The inlay consists of lines and veneers with a rich grain.

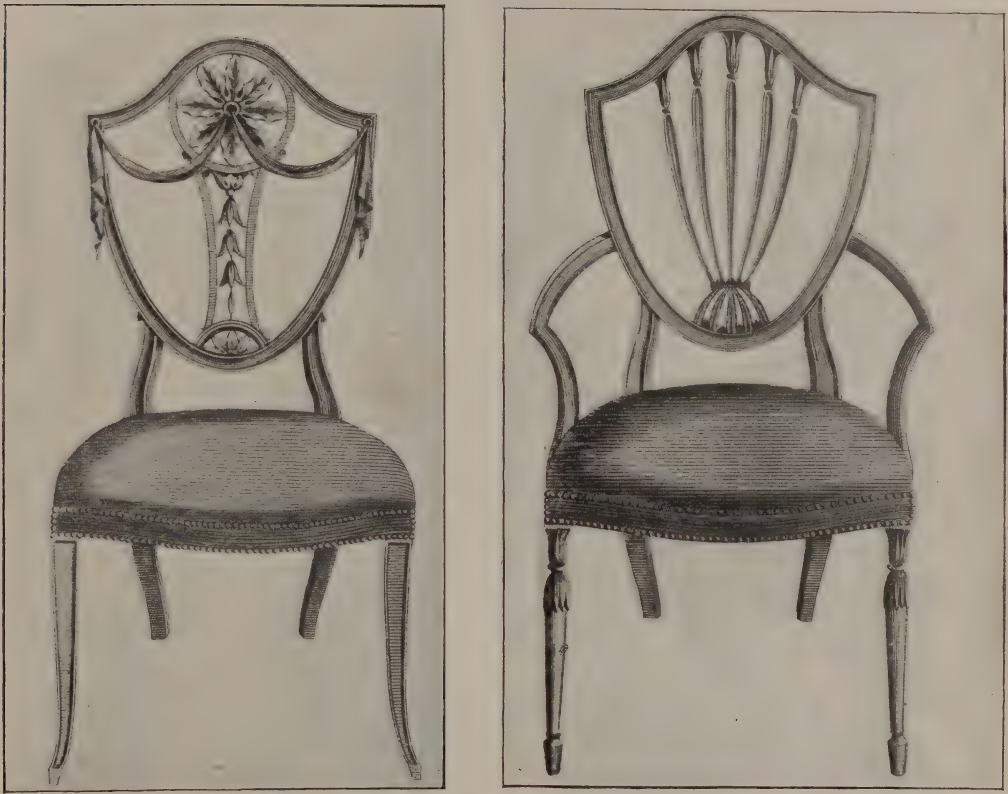
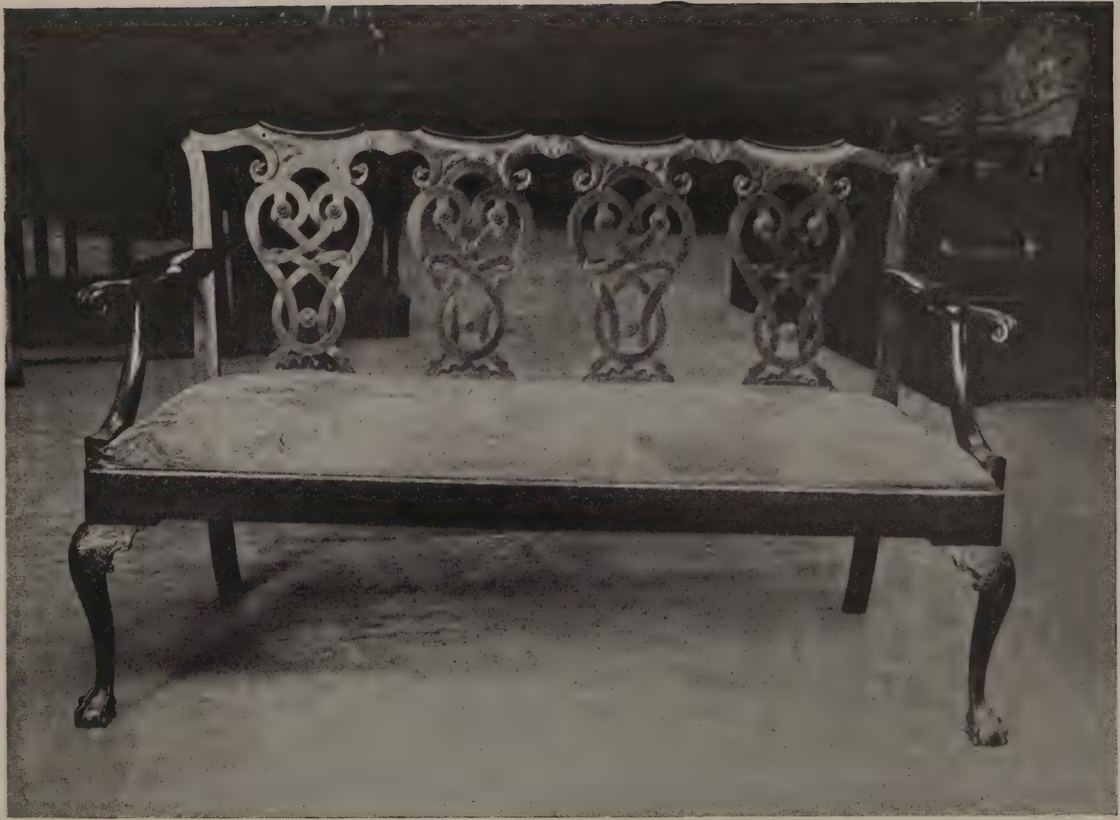


Fig. 8.—A Hipplewhite Chair.

Another Englishman, Thomas Sheraton, published, in 1791-93, designs showing sideboards, with pot cupboards, cellarettes and shelves. The character of the designs by these two men, Hepplewhite and Sheraton, does not resemble in scarce any particular the work of Chippendale, yet it is constantly called such, probably because it has a quaint appearance, and it has become customary to call anything odd, Chippendale.

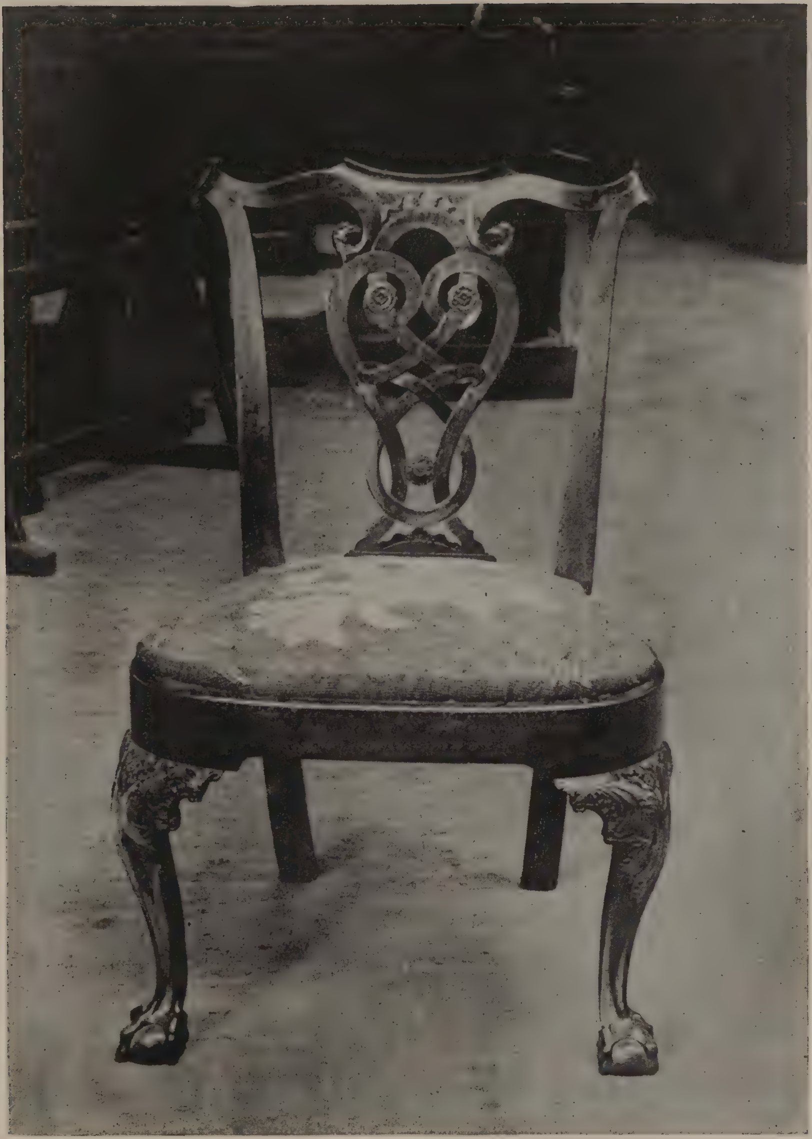
Sheraton's furniture is more elaborate than that of Hepplewhite. The legs are fluted, whether square or turned, and the square portions receiving the framing are veneered with inlay or carved. The edges of the drawer faces often have a band of inlay made of alternating strips of colored woods.

Every opportunity is taken to ornament the different surfaces by either carving or inlay. The inlay serves as a means of distinguishing these makes from that of Chippendale, for probably he did not make use of inlay at all, certainly not frequently; and if a piece of English furniture of



MAHOGANY SETTEE DESIGNED BY CHIPPENDALE FOR THE BURY FAMILY, OF KATESHILL, BEWLEY, ABOUT 1750.
(From "The Art of the House," by R. M. Watson.)

BOSTON PUBLIC LIBRARY



CHAIR DESIGNED BY CHIPPENDALE.

BOSTON
PUBLIC
LIBRARY

this period is inlayed we may quite safely call it a Hepplewhite or a Sheraton.

Sheraton says of sideboards: "It is not usual to make the sideboards hollow in front, but in some circumstances it is evident that advantages will arise from it. If a sideboard be required nine or ten feet long, as in some noblemen's houses, and if the breadth of it be in proportion to the length, it will not be easy for a butler to reach across it. I therefore think, in this case, a hollow front would obviate the difficulty, and at the same time have a very good effect, by taking off part of the appearance of the great length of such a sideboard. Besides, if the sideboard be near the entering door of the dining-room, the hollow front will sometimes secure the butler from the jostles of the other servants."

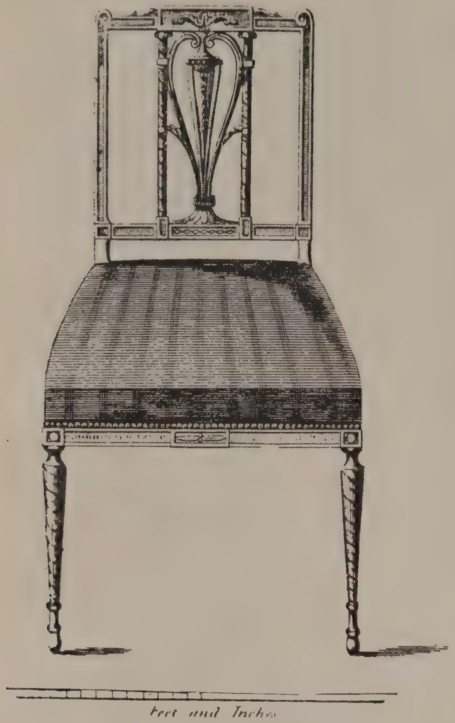
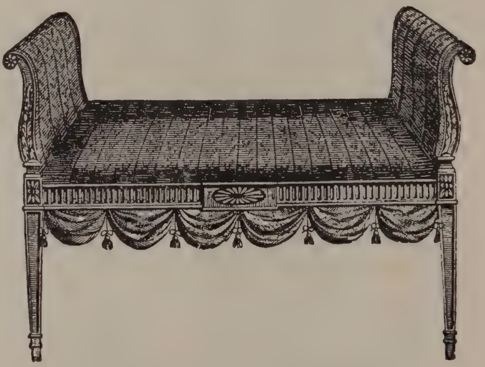


Fig. 9.—A Sheraton Chair.

It is quite easy to distinguish chairs of the Chippendale pattern from those of Hepplewhite or Sheraton. We say *pattern* because we do not wish to infer that either of these three men whose names are so prominently associated with the furniture of the late eighteenth and early nineteenth centuries, were the exclusive makers of the styles which bear their name. There were many others who made the same character of furniture and it is impossible to say from its appearance alone that any particular article was made by either of the men referred to. All we can say is, that it is in the style of Chippendale, Hepplewhite, or Sheraton. Hepplewhite used the shield shape, ornamented with wheat ears, for the back of the majority of his chairs, and the legs were square. Sheraton used on most occasions an approximation of the rectangle for chair backs, and the legs were turned.

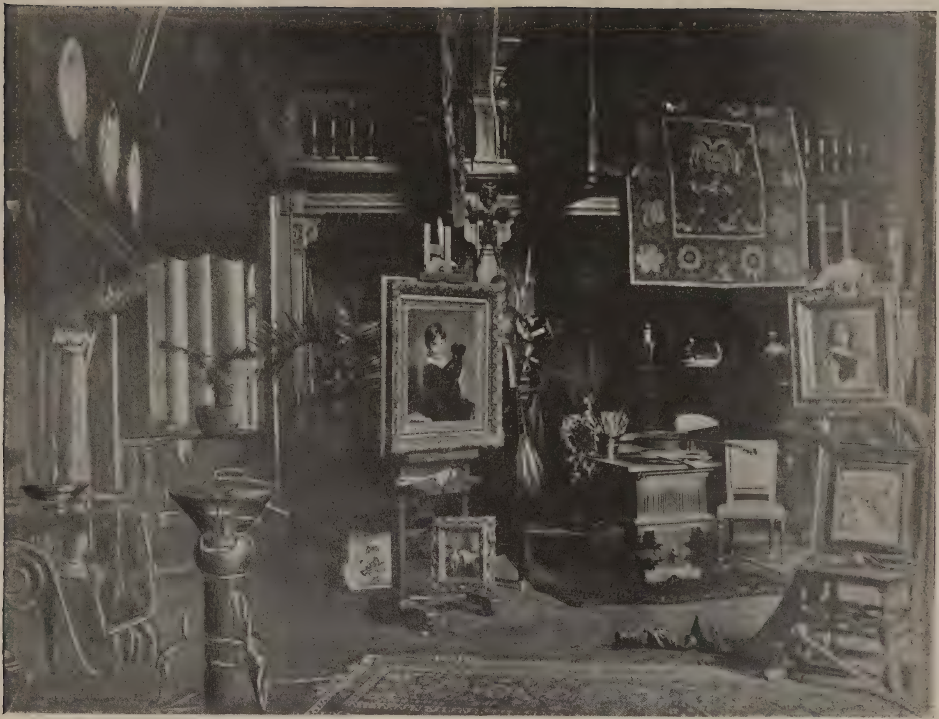
Though Hepplewhite made chairs and carved them in a manner similar to that of Sheraton it was when working in woods to be lacquered and decorated, instead of mahogany. This lacquered work was subsequently displaced by white paint, like our enamelled work, and was popular with all the furniture makers of the period.



A Window Seat by Hepplewhite.

With the above facts in mind there should be but little difficulty in deciding whether an article of furniture is of the Chippendale (Rococo) period or of the later Renaissance revival used by Hepplewhite and Sheraton.

Alvan C. Nye.



THE STUDIO OF M. EMILE WAUTERS.

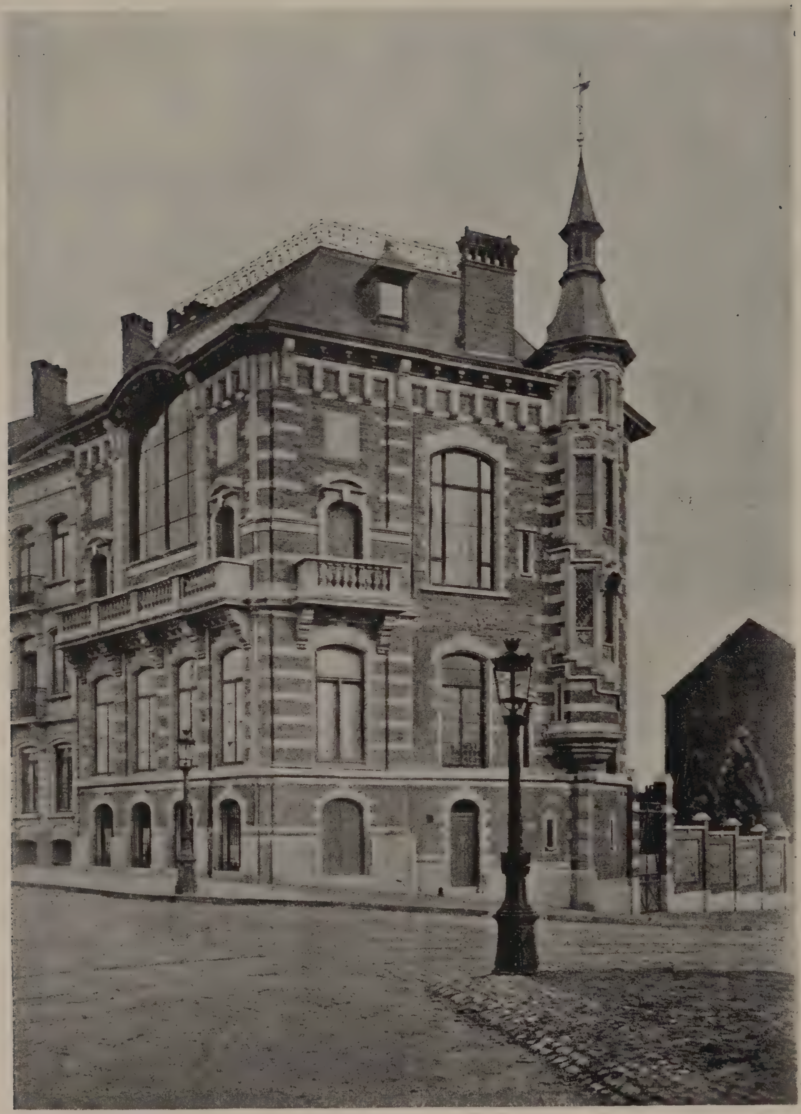
A FLEMISH PAINTER'S ART TREASURES.

IN the city of Brussels, at the end of the Rue de la Loi, not far distant from the Parc du Cinquantenaire, and the Decorative Arts Museum, there stands a house built in the Flemish Renaissance style. The edifice we speak of, which attracts notice by its handsome turret, here depicted, was a few years ago the residence of Mr. Emile Wauters, the well-known painter, collector and keen connoisseur. This large building, designed by Mr. Janlet, who received the Grand Prize of the Rue des Nations at the Paris Exposition of 1878, contained a splendid studio which was one of the great sights of Brussels. Here Mr. Wauters gathered together a choice collection of Dutch and Flemish works of art, the whole of which, we may say, now adorns his Paris *atelier*, where the portraits of many American beauties have been painted by him.*

Mr. Wauters' art treasures comprise pieces of furniture dating from the Renaissance and the Regency, banners of the "Guilds," wood carvings, terra cotta, an interesting group of musical instruments, Delft-ware, varnished earthenware from Lorraine, some very original stoves of the last century, numerous woven and embroidered cushions with the arms of the United Towns and Provinces, sacerdotal and other vestments of the 15th, 16th and 17th centuries, weapons, brasses, etc., etc., the whole being displayed with a colorist's taste and

---

*Among these ladies we may particularly mention Miss Carroll, of Baltimore; Miss Pierre Lorillard, Mrs. Parker Deacon, the Comtesse de la Forest-Divonne, nee Audenred, the Princesse de Chimay, nee Ward, the Misses Isaac Bell, and Mrs. Sharron, of San Francisco.



RESIDENCE OF M. EMILE WAUTERS.

eye for harmonious effect. This truly artistic collection includes a number of those life-like portraits belonging to the fine 17th century school represented by Moreels, Mierevelt, De Vos, Terburg and others, as well as paintings, studies, etchings and sketches by various masters.

The walls of the immense staircase were adorned with Brussels tapestry, having large designs illustrating incidents in the lives of Jacob and Esther; its steps were covered with long Persian carpets brought back by Mr. Wauters when he returned from his travels in Egypt and Morocco; its two large windows were of richly colored stained glass with escutcheons and armorial bearings—evidently the debris of some Friesland castle.

We reproduce a general view of this sanctuary of art, which the Paris "Figaro" once referred to as being one of the most fascinating in existence, comparing it with those of the painters Mackart, at Vienna, and Munkacsy, in Paris. The subjoined plates will give the reader an idea of a few of the many rare and curious objects included in M. Emile Wauters' collection. The following is a description of these:

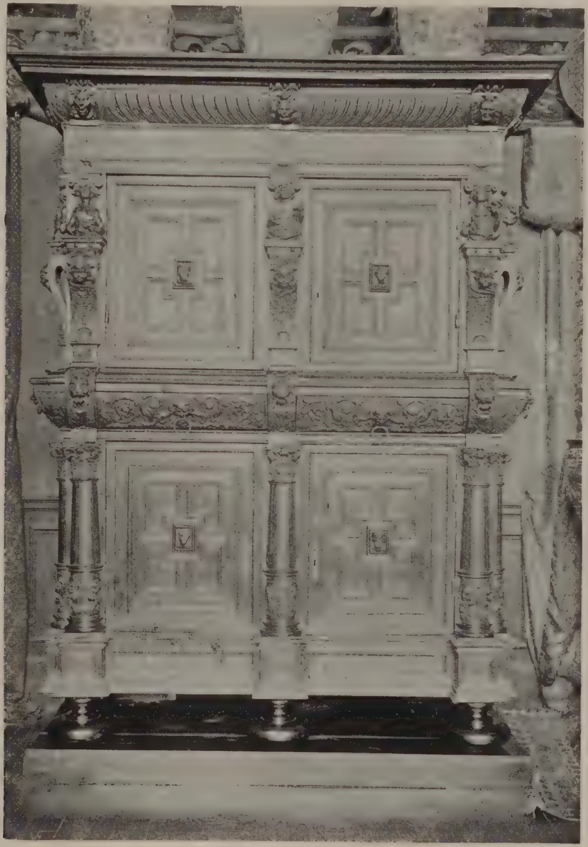


FIG. 1.—FLEMISH CUPBOARD.

(1) An oak cupboard of the Flemish Renaissance period. It consists of two parts, and is inlaid in rosewood and satinwood. This handsome piece of furniture is considered the finest of its kind in Flanders, where it is known as the "Cupboard of the Five Senses." The lower part is ornamented with Corinthian columns at each corner and in the center, and is surmounted

by a frieze of foliage and lions' muzzled. The upper portion is separated into two divisions by caryatides representing the Five Senses. The middle one, Hearing, is playing the lute. These busts are supported by brackets carved with angels' heads. On each leaf of the two folding doors there is a man's head in high relief. The upper frieze is divided by grinning masks, all of different models. This cupboard stands 8½ feet high, and is 6 feet in width. Date 1620. The proportions are well planned and imposing, the mouldings finely traced, and the profiles strong and animated. The general aspect is simple, without too much ornamentation, the heads and the friezes being bold but not affectedly so. The whole is in decorative harmony, sculptural art sustaining architecture while according it a predominant rôle. Flemish Renaissance may perhaps be somewhat heavy, lacking, as it certainly does, the delicacy of the Italian and the French, but it possesses, on the other hand, a wider grasp, a more virile spirit, and the restricted ornamentation allows the geometrical element to speak with all its grandeur and eloquence. In French furniture, dating from the Renaissance, the lavish decoration is often a positive defect, and we know of a certain celebrated example of which it might be said that "it is all ornamentation."

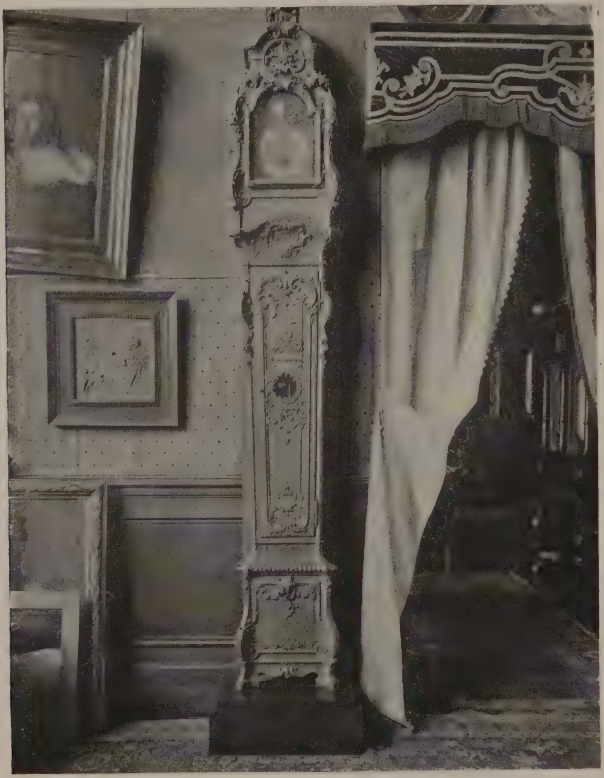


FIG. 2.—LIEGE CLOCK-CASE.

(2) A Liège clock-case, in carved oak, belonging to the Regency epoch. This piece of furniture came from a convent of the Black Sisters at Waremme. It stands 8 feet high, and is a gem of elegance. It resembles French art of the same period. It is supposed to be the work of the Hermans, of Liège, a family of wood carvers who have left numerous specimens of their talent. The design is perfectly orig-

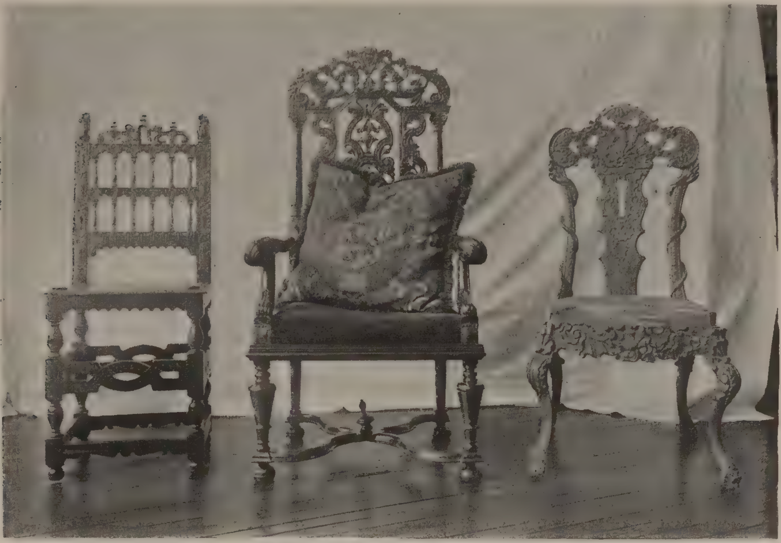


Fig.—3. Fig.—5. Fig.—4.

inal, the taste exquisitely refined, and the execution in all respects marvellous. The glazed cupboards by these artists, in two parts and with a fronton, are much sought after. The Belgian museums possess a few specimens in the most charming Regency style.

(3) An oak chair, which connoisseurs have attributed to Vredman de Vries, de Lesuwarden, the celebrated furniture designer of the 17th century, whose engravings show how fertile was his imagination and how severe his style, a style strictly his own. A chair of the same model is comprised in the Sauvageot collection in the Louvre, except that a St. George takes the place of the small upper portico.

(4) A chair, in walnut, Dutch Louis XV. style, with rococo ornamentation. The carving, perhaps, is not very delicate, but the outline is graceful, the lines supple, the movements undulating and nervous, indicative of boldness of invention. The chair is rich, elegant and very handsome in appearance.

(5) An armchair, Dutch Louis XIV. style, in polished walnut. The back has open-work ornamentation. The general effect is extremely pleasing; small columns and balusters of pure design, and arms the curves of which are well traced. The cushion placed on this chair is finely woven and bears the arms of North Brabant upon it. It dates from the beginning of the 18th century. The stitch is fine and close and the heraldic lion very archaic, the colors standing forth distinctly from the dark green canvas ground.

(6) A small door of a room. Renaissance style, in oak, incrusted and inlaid with ebony and rosewood. It came from a castle at Ypres, in Flanders. Height, 7 feet 7 inches; width, 3 feet. This is a charming composition, delicious in its simplicity and highly architectural in its arrangement and coloring. The lines are easy, the mouldings fine, while the delicate carvings are treated in a really masterly manner. Here, again, the architecture stands prominently forth, with its perfectly balanced lines and proportions.

The small bench shown in the same figure belongs to the period of transition from the Gothic to the Renaissance. Upon the bench is an ivory lute inlaid with mother-of-pearl and ebony. It is signed "Johannes Hofman, Leipzig, XVII. century."

(7) This moneychanger's table, in

oak, is an extremely curious sample of 15th century art. The top, when turned, brings to view a number of drawers and hiding places. The table stands on two massive carved feet. Height, 32 inches; width, 39 inches. The wooden figures in the Bruges style, standing upon the table, are very rare specimens; the St. Sebastian seems to have been taken from a painting by Memling, while the Virgin, draped in her Gothic robe, with its long and ample folds, might conceivably have come out of one of Jean Van Eyck's panels. A chased silver crown, enriched with precious stones, once covered the Virgin's head, but was stolen.

By the side of these, which date from 1400, is a soup tureen in the shape of a turkey-cock, in Brussels earthenware, made in Mombaert's pottery in the year 1720. The cover, representing the head of the bird, may be detached from the dish. This ornamental piece is well executed and very realistic, the coloring being strong and rich-toned. The enameling recalls that of the most beautiful Delft polychromes.

A dalmatic in green silk velvet, embroidered with bands of orfrays is another of M. Wauters' treasures. On the horizontal bands, behind, St. Elizabeth, of Hungary, is depicted distributing garments to the poor, while on the front St. Martin is shown in the act of dividing his mantle. The vertical bands are ornamented with figures of male and female saints. The workmanship is exceedingly fine. This dalmatic, which formerly belonged to

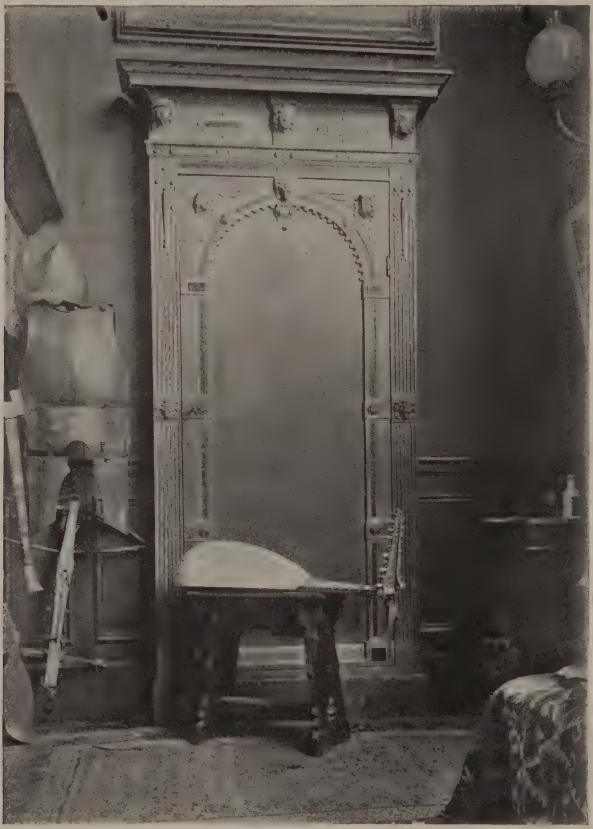


FIG. 6.—DOOR FROM A CASTLE AT YPRES.

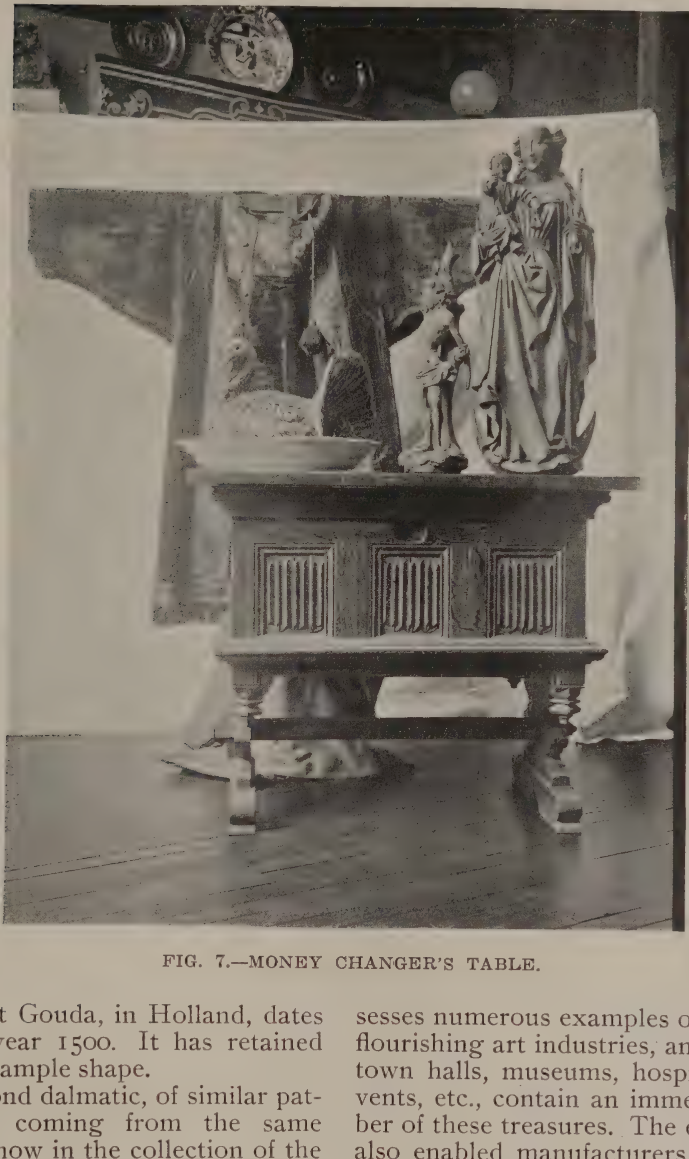


FIG. 7.—MONEY CHANGER'S TABLE.

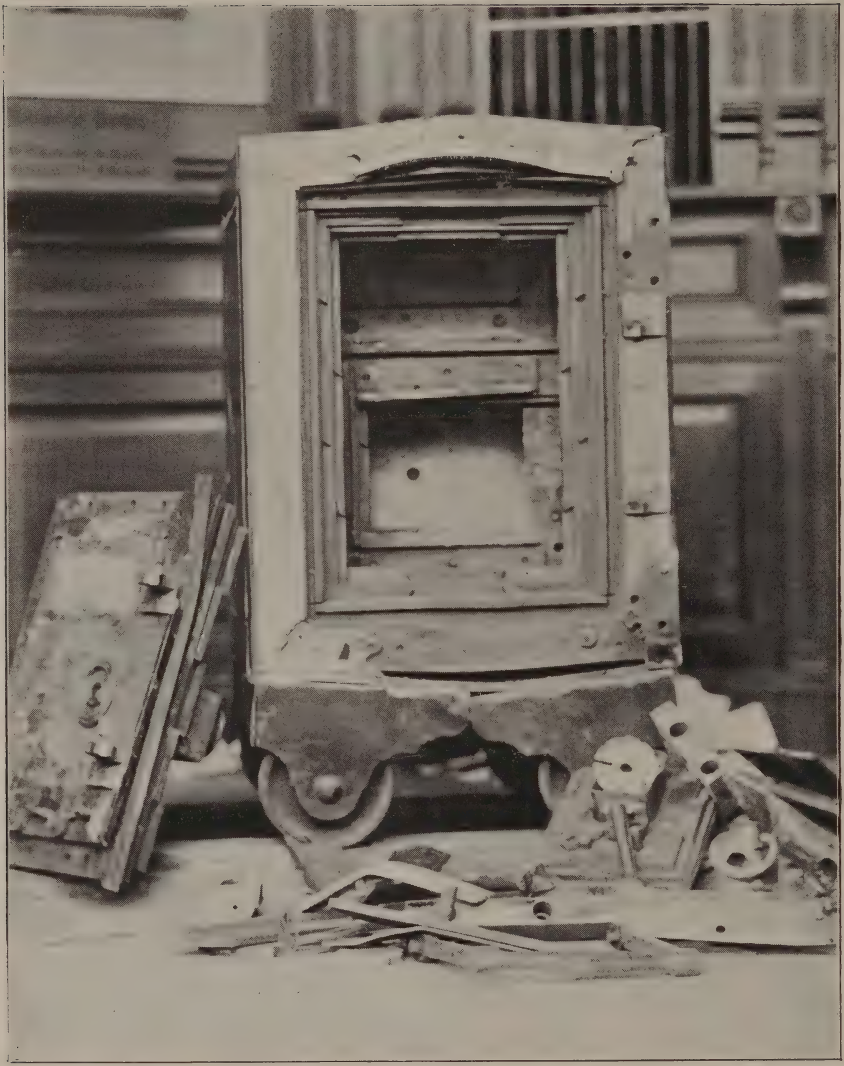
a church at Gouda, in Holland, dates from the year 1500. It has retained its original ample shape.

The second dalmatic, of similar pattern, and coming from the same church, is now in the collection of the city of the Hague.

The whole of these rare objects were exhibited at the important exposition of ancient art which was held at Brussels in 1888, and demonstrated that Belgium still possesses numerous examples of her once flourishing art industries, and that the town halls, museums, hospitals, convents, etc., contain an immense number of these treasures. The exposition also enabled manufacturers to learn something from models and processes that were very little known; it reawakened the artistic spirit in workmen, improved their technical knowledge, while it opened up to the archaeologist a wide and fertile field of study.

A. J. Wauters,

Professor of the History of Art at the Royal Academy of Brussels.



VIEW OF SAFE BURGLARIZED IN FRANKLIN GROVE BANK, FRANKLIN GROVE, ILLINOIS.

BOSTON PUBLIC LIBRARY

READING ROOM OF THE MISSOURI SAFE DEPOSIT CO.
St. Louis, Mo. John Beverley Robinson, Architect.

MODERN VAULT CONSTRUCTION.

THE ordinary portable burglar-proof safe is the type of the burglar-proof vault. Vaults indeed are distinguished chiefly by their size; a vault is a safe big enough to walk into, with other minor differences that we shall hereafter note.

Ordinary portable safes, such as that which is shown in Fig. 1, are of various sizes up to about six feet width of front and seven feet height. The depth inside in the clear, even of large safes, must not exceed the reach of a man's arm, which means about three feet depth outside, owing to the thickness of the walls and doors and the space required for the mechanism.

Vaults proper, such as are large enough to walk into, are usually eight feet high inside and as large as required on the floor—seldom less than eight feet square, and seldom needed more than eight by sixteen feet for the use of banks.

Safe-deposit vaults are often built of great size, forty feet square or more; the height, however, does not exceed eight or eight and a half feet.

With the portable safe we have not much to do at present, as it is only when the safe has grown to the dignity of a vault in size that especial provision need be made for it by the architect.

In arranging a place for the vault, whether of a bank, safe-deposit company, or other concern needing one, the first consideration is to place it clear of contact with the building on all sides. A space wide enough for convenient passage at least, must be left all around the vault; a similar space between the top of the vault and the ceiling of the room in which it stands.

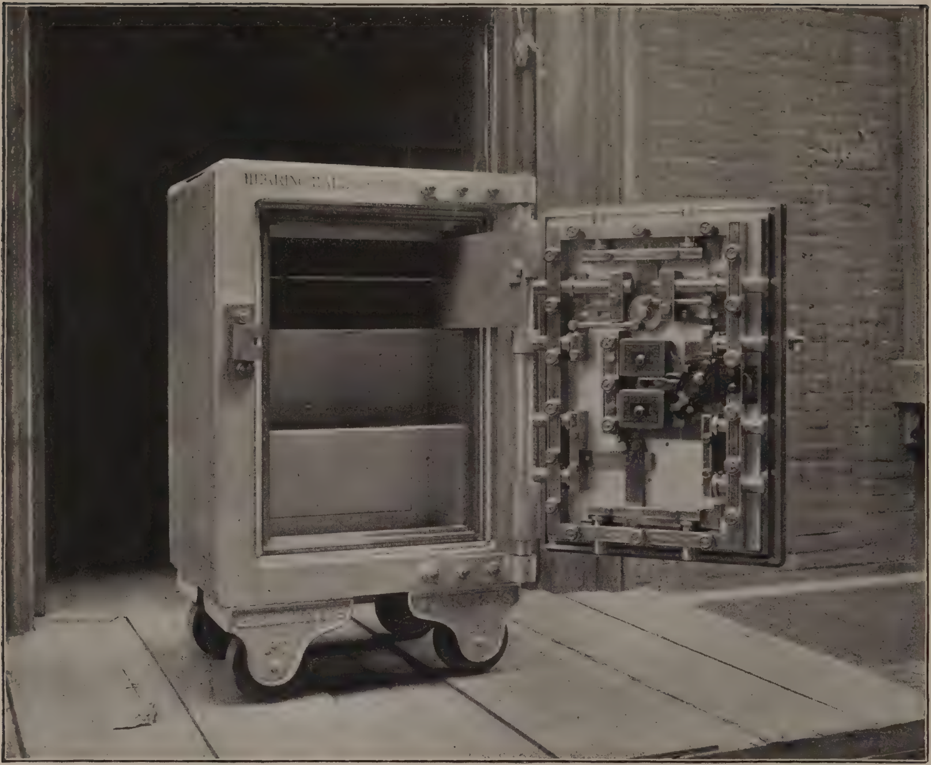


FIG. 1.—PORTABLE OFFICE SAFE.
Showing inside of door and mechanism of bolt-work.

while the space in the room below the vault must also be open for continual inspection. Often an open grating in the floor surrounds the vault, making it possible for a patrol to watch the whole circuit in two stories at once. When this is done the bars of the grating must run in the direction of the path of the patrol, to permit an easy view.

This matter of the isolation of the vault, although often neglected, is a fundamental requirement for safety.

The next thing to be looked out for, trivial as it may seem, is the swing of the entrance door. In the first place, the throw of a vault door is very much greater than the width of the clear entrance. If the inside entrance door is to be two feet six inches wide, clear of the bolt work, we must add to this about three inches for the bolt work, as much again for the opposite rabbetted jamb (a matter which will be explained hereafter), and again another foot for the splayed, rabbetted jambs of the outside door. Add to this several inches more for the working of the mechanism of the hinges, and we have four feet six or eight as a minimum throw of the outer door to be provided for. Again, it is quite usual to place the floor of the vault a foot or so below that of the room in which it stands. This is done so as to bring the highest point of the rabbetted sill low enough to allow a movable platform to be placed over it, terminating in an easy slope inside the vault. This is done to do away with the annoying and dangerous stumbling-block that would otherwise be formed by the rabbetted sills of outer and inner doors. It is one of the standing difficulties in the use of vaults; so much so that a movable sill, which lies down flat, out of the way, has been invented and may be used. But, when this is not used, the lower edge of the outer door will swing below the level of the floor of the room, and provision must be made for it.

Finally, all vaults must stand on a foundation of their own; not on beams, however strong. Beams are sure to bend a little, and the slightest bending will throw the swing of the great doors out of true, so that it will be impossible to open and close them. Besides, the tremor of a floor would tend to disturb the mechanism of the time-locks. Moreover, to stand a vault on a floor makes the integrity of the vault depend upon the stability of the building; a fire, or earthquake, or explosion, or unaccountable fall of the building, would carry with it the vault, which might be penetrated in the crash. So it may be laid down that a foundation of its own a vault must have, preferably of brick arches. We shall again allude to foundations, after we have spoken of the construction of the vault itself.

In planning a safe deposit vault much more careful provision is required than for any other kind. The arrangement of the interior depends upon the placing of the banks of small safes, with which the vault is to be filled. These safes are of a regular depth, usually two feet, whatever may be the size of the door in the face of the stack. The passages between the stacks should not be less in width than three feet, nor greater in length for a "cul-de-sac" than ten feet. This, for two reasons, partly for ventilation, as the air is apt to stagnate in long blind passages; partly to avoid undue interference and jostling among the depositors.

Fig. 2 shows a plan of a large vault and the arrangement of the banks of small safes.

Fig. 3 shows the interior of the same vault, with a bank of safes in place.

The placing of the entrance and exit is determined by the general plan of the offices, and upon this, in turn, depends the laying out of the passages and banks of safes inside.

Every safe deposit vault must have two entrances, each complete, with vestibule and outer and inner doors, as will be hereafter explained. The most economical form of vault is about eight feet wide, with a door at each end, and banks of safes on each side. Up to twenty or twenty-five feet in length, this will do very well.

Beyond this, some form of square or oblong vault, with transverse secondary passages, branching from the main passage must be used, as the single straight passage begins to pass reasonable length.

Two entrances are essential for safe deposit vaults on account of the ever-present possibility of an accidental lock-out, caused by defect or stoppage of the time-locks. With banks a lock-out is disagreeable enough, but for a safe-deposit company, with hundreds of concerns wanting to get at their deposits, such an occurrence would be fatal. Two entrances render the chance of an accident to both at the same time infinitesimal.*

Indeed, it would always be well, were it not for the cost, to provide bank vaults and all kinds of vaults with two entrances. On account of the cost, however, this is rarely done. Various expedients are resorted to with the same end. I have designed two vaults alongside each other with a hole in the partition wall, usually covered by a steel plate cover, secured by bolt work and locks, but serving to give access to either safe from the other in case of a lock-out. A similar design I have made in two stories, with a hole in the floor between, similarly made secure.

Another continual care of safe-deposit officers is the ventilation of the vault. The unavoidably contracted space, with many people frequenting it, and only two doors giving admission to the outer air, is sure to make trouble.

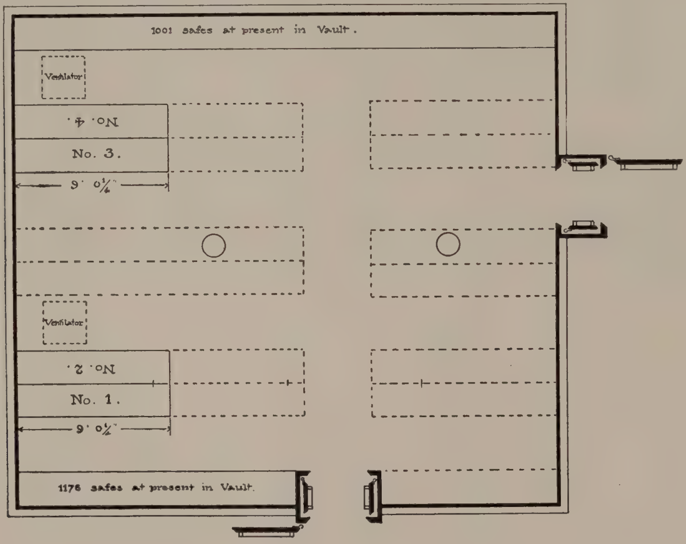
---

*Fig. 4 shows the entrance door of a vault, the outside and inside doors both open, and the open-barred "day-door," as it is called, visible.

The best thing to do, although costly, is to make one or more holes in the ceiling of the vault, with covers fitted precisely as the doors are fitted that can be lifted by screw, or other power, while the vault is in use, and closed at night and bolted inside.

Such an opening, enclosed in a sheet metal trunk, may be connected with a Blackman-wheel air-current, and the interior of the vault supplied with abundance of fresh air.

The use of electric lights has simplified the question of vault ventilation, which, in the days of gas light, was an almost insoluble problem.


1001 safes at present in Vault.
Ventilator
No. 4.
No. 3.
9' 0½"
Ventilator
No. 2.
No. 1.
9' 0½"
1176 safes at present in Vault.

Plan of Vault.

Fig. 2.—Plan of a large vault, forty feet square, for safe-deposit company, showing location of stack of safes and of passages between them.

For both safes and vaults there is one predominant method of construction; there are besides this half a dozen other methods more or less in use.

The usual way is to build up the required thickness of the walls with plates of steel screwed together. These plates vary from half-an-inch to two inches in thickness. Half-inch plates are commonly used, with an inch plate on the outside, because such a construction is much cheaper than the same thickness of walls built up with inch plates throughout. Inch plates are stronger and better construction, but half-inch are very good, and quite usual.

The plates are not generally all of the same material. Steel, indeed, they all are, but the alternate plates are usually of chrome steel.

Nor are these chrome steel plates simple; they are in themselves compound, each plate being built up of five plates, rolled together hot, welded into one mass, the central and interior layers being of ordinary homogeneous Bessemer steel, the intervening two layers, making five layers in all, of chrome steel proper.

Chrome steel has a small proportion of chromium added, which gives to it an excessive hardness against attack by the drill—nothing but diamond drills and plenty of time to use them will cut it. By the use of the blowpipe, however, the temper may be drawn, and it is then drilled with as much ease as other soft steel. It is rolled in layers, as described, because with extreme hardness there is an accompanying lack of tenacity which the layers of ordinary steel are intended to supply.

The plates that are not chrome steel are of the usual mild steel, which is so fast supplanting iron, being both better and cheaper, rarely as those qualities are found together.

The illustration Fig. 5 shows this construction, although the difference in color of the chrome steel is exaggerated for the sake of clearness in explanation. In fact, it is difficult to distinguish the different layers by the eye in a piece of polished or cut five-ply chrome steel. A broken edge shows some differences in the fracture, but even these are not conspicuous.

The plates are fastened together by screw bolts screwed in from the inside. These are not long enough to penetrate the outside plate; they give no indication of their position. The bolts that secure each succeeding plate are carefully laid out so that no two bolts occur at the same point.

The whole vault is built up in the shop of untempered plates screwed together just as it will be in the bank, safe-deposit office or other institution for which it is destined. It is then taken apart; the plates are tempered and afterwards straightened before they are taken to the place where the vault is to be built.

The walls of vaults vary in thickness. Three inches is a good thickness, four inches ample, and the thickest built, so far, is six inches thick.

All vaults of any pretension at all are provided with a double set of doors at the entrance—with what is called a vestibule. The illustration, Fig. 2, shows the plan of a large vault built under the charge of the writer with the usual vestibules. The vestibules may be deep enough to contain the whole of the inner door, when open, or may be only deep enough to accommodate the knobs and levers of the inner door and the bolt work on the inside of the outer door when both doors are shut. In the former case it is possible to make the opening of the outer doorway no larger than that of the inner—in the latter case the outer doorway must have additional width enough for the inner door to stand out at right angles.

The clear width required for the inner doorway is not less than two feet six inches, nor more than two feet ten inches. Both outer and inner doors are by preference single doors, because such can be made stronger than double doors; often, though, for convenience the inner doors are made double, one opening into a pocket on each side of the vestibule.

Both outer and inner doors fit into their jambs with rabbets and grooves, shown in Fig. 6. Each steel plate of which the door is composed sets back from that outside of it, and if more than half-an-inch thick is itself rabbetted in its thickness in half-inch steps. Besides these rabbets there are used in each door usually two groove irons, as they are called, really angle irons; for thick doors three are used, but rarely less than two, for in addition to the rabbets, and as far more efficient, the grooves are depended upon to exclude explosives. For still more perfect protection the edges of the angle irons are corrugated, as seen in the illustration, and in the bottom of the opposed groove is placed a strip of rubber or asbestos packing upon which the sharp edges of the corrugations press tightly and form an air-tight joint. This closeness of joint is especially meant to keep out nitro-glycerin, which is used in liquid form in the attack.

Two things are needed for the attack, force and time. The force must be such as can be used quickly. Drills are all very well, but wedges, driven by a copper-headed sledge, which makes but little noise, start the edge of a plate more quickly. Into the minutest crevice a little nitro-glycerin penetrates, drawn into incredibly small space by capillary force. The explosion tears away more or less of the plate, leaving the next joint exposed for the wedge.

When circumstances prevent the use

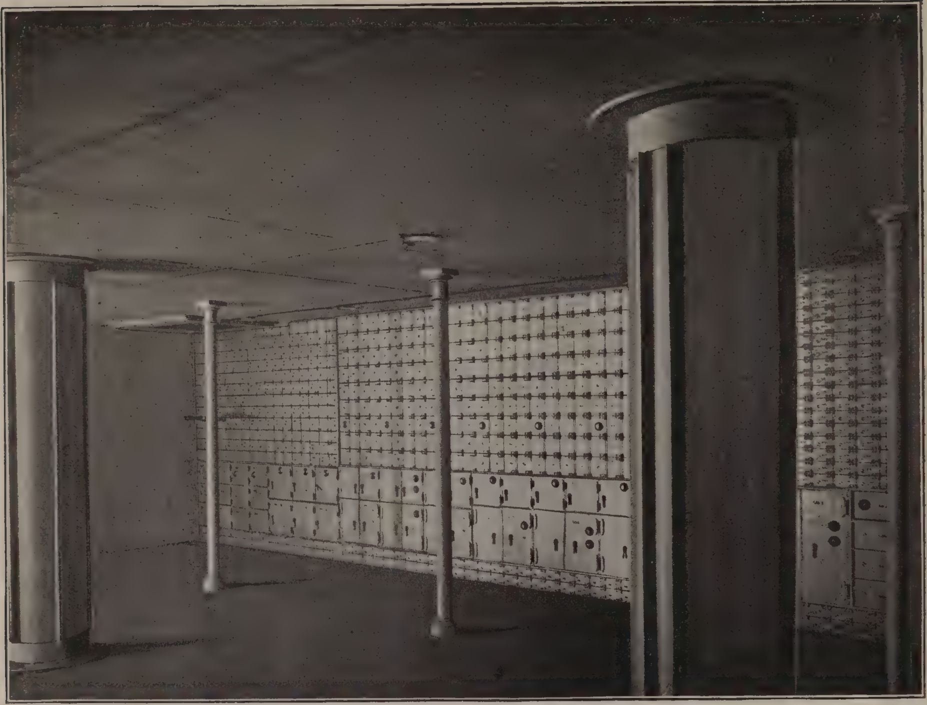


Fig. 3.—Interior of large vault shown in plan in Fig. 2. Of the safe deposit safes the larger lower ones are for the use of banks and large concerns, the upper and smaller for individuals. The two large columns are part of the construction of the building. The small columns will be removed when the rest of the stacks of safes are put in place.

of explosives the drill and the hydraulic ram are resorted to, but for speed and force combined, explosives are preferred.

The noise of the explosion, muffled by the walls of the building in which it occurs, to outside ears, seems to passers who may happen to notice it like some distant report, or often attracts no notice at all. For this reason it is often possible to use explosives where it would seem to be impossible without immediate discovery.

Nitro-glycerine is the agent most feared nowadays. It will penetrate any joint, and at least relax it with its tremendous shock, giving space for the introduction of a heavier charge. Although dangerous to make and difficult to buy, it is easily obtained from ordinary commercial dynamite, which is nothing more than nitro-glycerin held in absorption by infusorial earth or other absorbent. The liquid nitro-glycerin is obtained by the simple process of dissolving it out with ninety-five per cent alcohol, and then precipitating the nitro-glycerin by the addition of water.

In order that doors constructed as has been said with rabbets and grooves may be opened and closed, something more than ordinary hinges is clearly required. Something it must be that will move the whole door parallel to itself a distance equal to the depth of the grooves and rabbets, in most cases that is to say, half an inch. To do this several kinds of crane-hinges, as they are called, have been devised, which accomplish their purpose admirably. Not a trifling matter this either, to wield at the end of a rotating arm, to suspend upon it in a position where it can easily be moved backwards and forwards, and yet is so firmly immovable otherwise as to fit with accuracy into its complicated seat, a weight not less than four tons, often six, and sometimes as much as ten.

Alhough the weight of the heaviest vault is trifling compared with the weights that architects are accustomed to deal with in building, yet certain precautions are necessary in providing foundations for them. The vestibules especially must be upon an immovable base, for the slightest sag or settlement means a distortion of the door-jambs, and the impossibility of closing the doors. The bottom of the vault, although amply strong enough to sustain itself over ordinary spans, sav, up to ten feet, is apt to sag slightly in reaching its point of resistance, and is better supported by rolled beams placed three or four feet apart. These must be adequately supported by columns, piers or walls. for the vault must not rest upon the earth directly, as such a situation invites attack by tunnelling from a distance, which can be carried out with perfect security, as observation is in such an arrangement impossible.

Therefore all vaults are on some kind of open foundations, usually extending through a basement, and supporting the vault level with the floor above. Sometimes these foundations are in the form of a brick vault, less secure than the steel vault above, but sufficient for the storage of silver, paintings and valuable books. In this case the brick vault has a door like that of the steel vault, less ponderous perhaps, but substantially the same thing.

But if not used for this purpose the foundation should be as open as possible, the walls perforated with arches everywhere. Brick walls are much to be preferred to iron columns, as less likely to be destroyed by fire.

Columns, if used, should be securelv covered with fireproof material, as also should any iron columns that support the floor of the vault.

For supporting the floor brick vaulted arches, dispensing with iron altogether, are as much to be preferred as brick walls are to iron columns.

The ceiling of the vault up to eight or ten feet span will sustain itself. For wider spans some interior support must be provided. This is often furnished in safe-deposit vaults, which are the largest vaults in use, by the banks of small safes with which the vault is occupied.

These, however, are not usually put in all at once when the vault is built, but gradually as the business requires; because often the character of the business requires a change in the style of safe used, or new inventions must be included to make the safes rentable.

Until the banks of safes are put in it is usual to support the ceiling of the vault by small cast columns or pieces of wrought pipe. The ceiling is jacked up the half or three-quarters of an inch necessary, and when it comes down it holds the column firmly in place.

When the ceiling must be carried without columns over a clear span the steel beams necessary to carry it are placed outside, above the ceiling to be carried, and the outer shell is attached by conical eyebolts and suitable hangers to the beam. It would be as well or better to put the beams inside were it not for the valuable space they would occupy.

Vaults are usually made only eight feet high in the clear, because of the great cost of every added inch, and beams inside would cut this down, both for use and looks, very materially.

The steel walls of the vault itself afford sufficient support for the suspended ceiling without special provision in addition.

Thus built and upon such foundations stand some vaults, good ones at that, without defense against fire at all, being in buildings called fireproof, and certainly uninflammable in their constructive parts.

It is better, however, in all cases to provide some kind of fire-resisting jacketing. Of this, two kinds are commonly used. Nothing is better for fireproofing than a brick wall. It should be hollow, if possible, with two eight-inch walls or an outside eight-

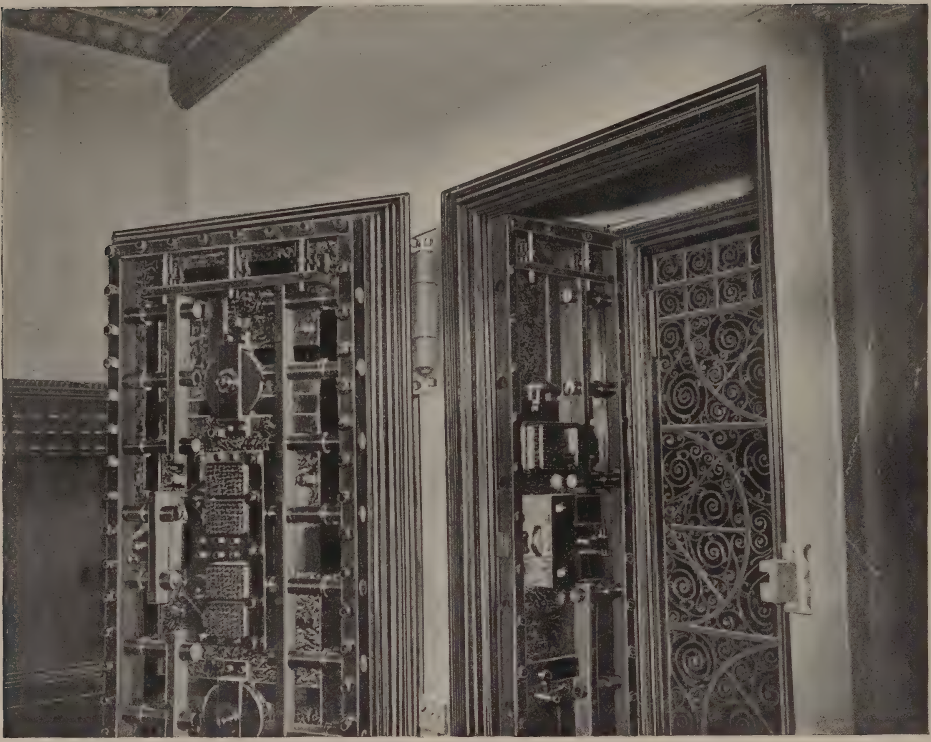


Fig. 4.—Entrance to a large vault, showing the main outer door open, one of the vestibule doors also open, and the "day-door" of ornamental scroll work closed.

inch and inside four-inch at least. The ceiling must be covered with at least four courses of brickwork.

All should be laid in good cement mortar; although lime mortar gauged with plaster of paris might be even better than cement. In a combustible building at least, this covering of the ceiling should be in form of brick arches, laid between iron beams, placed on the top of the vault, with the usual tierods, and made as strong as possible, to resist crushing bv a falling wall if fire should occur.

The great objection to brick walls is the space that they occupy. Two eight-inch walls with a four-inch space will be twenty inches, and this carried around a vault of fifty feet circuit covers about eighty-three square feet—a considerable space where space is most valuable. So sometimes the fireproofing is done with a covering of concrete—cinders, plaster and cement, mixed and filled in between the outside of the vault and a quarter or three-eights-inch plate of soft steel held to the shell of the vault by anchors at frequent intervals.

Besides the construction of the vault itself above described, there are, as has been said, several other methods.

In one, which is much used, and which is the subject of the Herring patents, spiegeleisen is used to resist penetration. This is a kind of iron ore found in nature and also produced as a waste product in certain processes. It can be cast into plates, and is of an excessive hardness, altogether impenetrable by the drill, although it can be chipped away without difficulty.

It is therefore used only with an outside covering of chrome steel plates, such as has been described, to protect it from violence, the spiegeleisen or Franklinite being depended upon to resist the drill.

Another constructon that gives a very good safe, and a much cheaper one than those hitherto described, is made of railroad iron—steel rails, placed head and flange alternately locking together. They are held together by iron rods, and they are bedded in a mass of Portland cement, which fills all interstices, preventing rust, and forming a continuous shell. Outside and inside are covered with steel plates for a finish.

This construction presents a serious obstacle to the drill, as the rounding and irregular surfaces of the rails and the certainty of encountering voids make drilling impracticable.

To the wedge and to explosives it does not present by any means the resistance of the steel plate construction. If used, the type in which the rails are placed horizontally and bent at the corners is much to be preferred to that in which the rails are vertical and depend upon the outer covering for connection at the angles.

It is not to be recommended for important work, but may serve a purpose for country banks, where cost is a paramount consideration.

Less used than any of these is a peculiar patented construction of cast-iron. Massive blocks, eight or ten inches thick, are united by groove and tongue joints. The hardness and thickness resists the drill, and the joints cannot be satisfactorily attacked by the wedge.

Another exceedingly interesting invention is the Corliss safe.

It is a massive spherical envelope containing another sphere, which revolves on vertical pivots within the first. This second sphere is divided into halves, one of which contains the deposit space, the other the locking mechanism and the fortifying metal face. The locking is done by bringing the interior sphere forward, into close contact with the jambs of the opening, which is too small to permit it to be taken out. To unlock, the interior sphere is screwed back an inch or so, and then is revolved, bringing the rear hemisphere to the front and giving access to the drawers and boxes. It is a clever device, and seems far less vulnerable to the powerful liquid explosives of to-day than a construction with numerous unavoidable joints.

It is, however, not well suited to vault construction.

It has always been a favorite fancy of my own to construct a vault with a water jacket. In all of our large cities there is an inexhaustible water supply. It would need but a strictly water-tight door to the vault itself, and a watertight envelope to the vault with another watertight door. The space between, once filled with water, from more than one secreted and protected pipe and provided with proper expansion pipes, would be a protection quite complete against fire. Equally impenetrable would it be to the enterprising burglar. The slightest penetration would make further penetration impossible. Tools could not work in a flood of water. To check it would be out of the question, as the valves which controlled it would be at a distance. Explosives would be useless against it, and if once started the flow of water would soon give an alarm of itself as it covered the floors and leaked out under doors.

All of the strength of wall and door, of ceiling, floor and vestibule, would avail nothing without adequate provision for locking. Nothing of course is thought of but the combination lock, an invention of admirable simplicity and efficacy. It has tumblers, three, four or more, as any other lock, but that these may all be thrown at the same time several wheels, each one with a single notch, must be turned so that the notches coincide. Simple as it is in principle, this is the basis of the most elaborate vault locks.

This alone, however, would not suffice. The secret of the combination entrusted, as it had to be, to two officers, was a distressing burden to the minds of both and at the same time placed the sole responsibility on no one person. At times, under fear of physical violence or at the point of a pistol, cashiers were compelled to reveal the combination, or were taken bodily to the vault and compelled to open it. As a safeguard against this the time lock was invented and is generally used. It is the same in principle as the alarm clock, but at the prearranged hour, instead of going off with an irrepressible jangle, it noiselessly withdraws a small piece of metal which, until then, prevented the working of the combination lock.

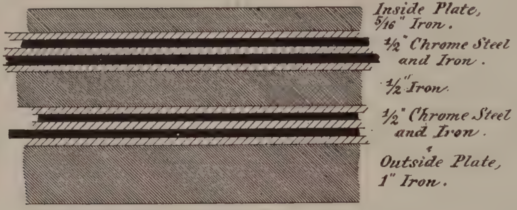

Inside Plate, 5/16" Iron.
1/2" Chrome Steel and Iron.
1/2" Iron.
1/2" Chrome Steel and Iron.
Outside Plate, 1" Iron.

Fig. 5.—Section of a part of the wall of a vault 2 13-16 ins. thick, composed of alternate soft steel or iron plates, and rolled, laminated chrome steel plates.

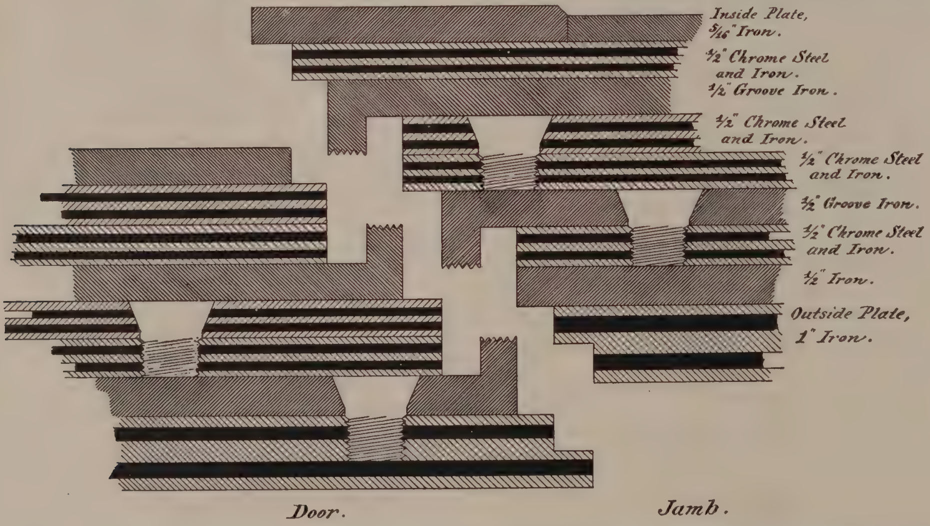

Inside Plate, 5/16" Iron.
1/2" Chrome Steel and Iron.
1/2" Groove Iron.
1/2" Chrome Steel and Iron.
1/2" Chrome Steel and Iron.
1/2" Groove Iron.
1/2" Chrome Steel and Iron.
1/2" Iron.
Outside Plate, 1" Iron.
Door.
Jamb.

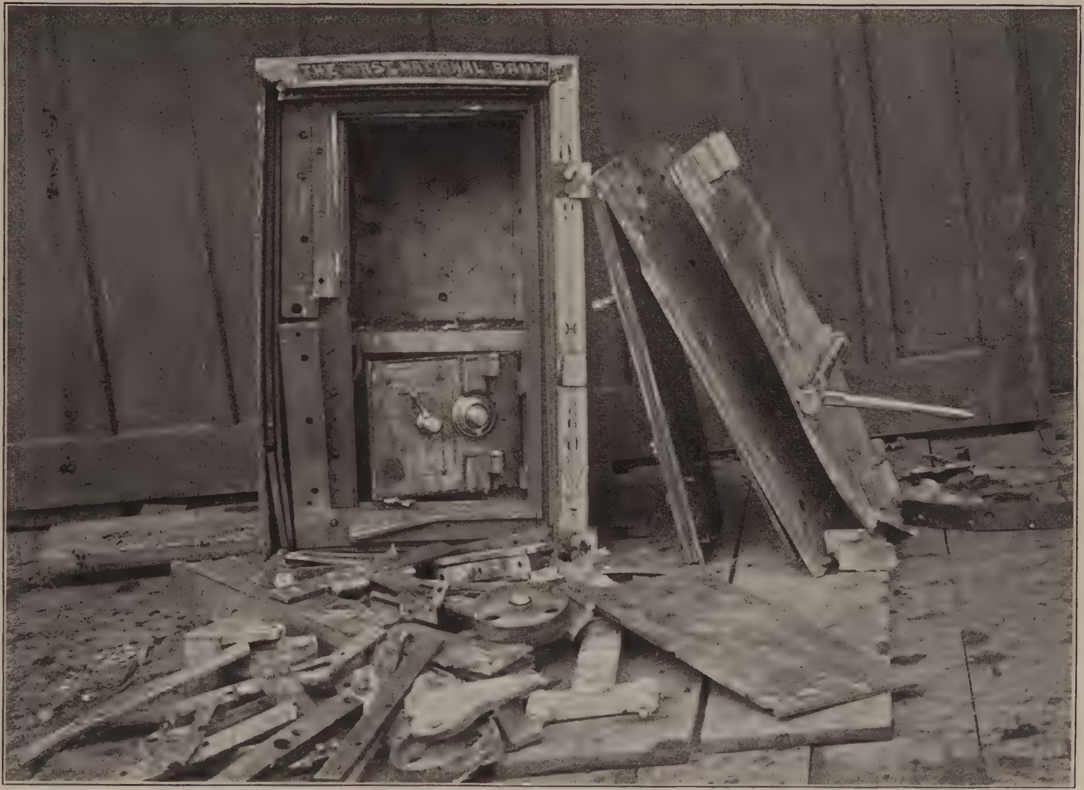
Fig. 6.—Section of the edge of an outer vault door 4½ ins. thick and corresponding edge of jamb, showing rabbets of jamb and groove irons with serrated edges. Four conical headed screw-bolts are indicated.

Two clocks are always used in each lock, in order that if one should stop from some of the ills that clocks are heir to, the other still would do its work at the proper time.

Notwithstanding this, both clocks at times fail to work and the vault is impenetrably secured; must be broken into by force if there be no other help for it.

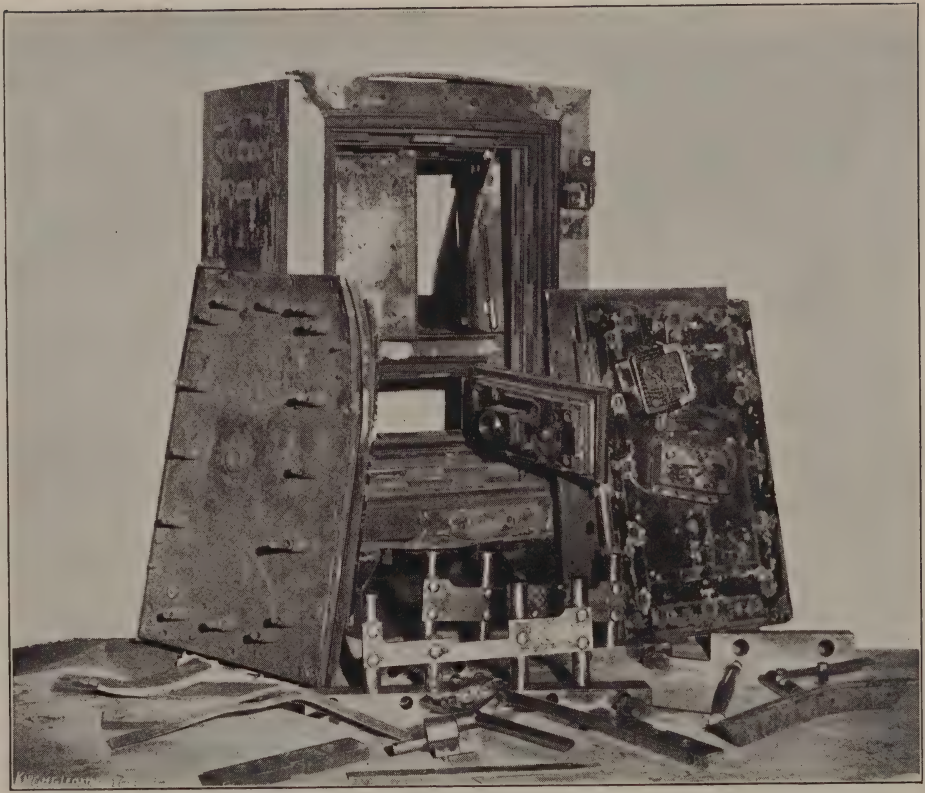
A perfect precaution is the use of two entrances to the vaults, which are necessary for every safe-deposit vault, even the least important, and almost as necessary, though not so invariably used, on bank and other vaults. With two entrances the chances against both being out of order at the same moment are infinite.

There is another device to avoid the annoyance of locking-out, an exceedingly clever and simple device it is.



VIEW OF A SAFE BURGLARIZED IN FIRST NATIONAL BANK, LIBERTY, MISSOURI.

BOSTON PUBLIC LIBRARY



VIEW OF SAFE BURGLARIZED IN THE SOMONAUK BANK, SOMONAUK, ILLINOIS.

OSTON
LIBRA

On each wheel of the combination lock at the time of manufacture is cut another notch at a certain distance from the unlocking notch. A record of the relation that these notches bear to the first set of notches is kept by the manufacturers. It is so arranged, too, that the secondary combination will not work unless the time-lock is not going. If a lock-out occurs the manufacturers send a man with the necessary information and the lock is opened at once. Even the discovery of the clue to the secondary combination would give no clue, it will be seen, to the primary combination.

A weak point of every vault is where the spindle of the lock penetrates the door. A hole through a door, however carefully protected, is an imperfection in its resisting power. Accordingly there has been devised an automatic lock, a time-lock like the rest, but so arranged that at a certain hour a mechanism of powerful springs is released, which throws the bolts and locks the door; and again at a certain hour withdraws the bolts and unlocks it.

The serious objection to this is that it does its work so well. Should a mob hold possession, having disposed of the proper officers, all the mob would have to do would be to sit around chewing tobacco at its leisure until the lock unlocked itself, when it could enter and amass considerable wealth. This consideration often rules out this clever automatic lock.

The boxes, as they are commonly called—safes, more properly—with which a safe-deposit vault is fitted up are matters of minute consideration. The depth is uniformly two feet; the difference in size is upon the face. This size varies from two-and-a-half by five inches to twenty by thirty, or more. Safes have been made as small as one-and-a-half by five inches, and under certain conditions these small safes rent easily. There is a multitude of small details of information about these matters quite essential to the proper construction, yet almost impossible to communicate in a magazine article. The horizontal partitions are a quarter-inch thick, rabbetted for a door-stop. To these the doors are hung by a special form of hinge that permits them to open flat back against the adjoining box. The hinges are all on the right hand of the person facing the door, the sinister side of the door, except when the door is against a wall on the dexter side, then it is hung the other way. Key locks and combination locks are both used, usually interchangeable to suit the tenant, and each having advantages of its own, which will occur to anybody. The keys are different up to a certain point, but when the safes exceed a certain number there will be more than one safe in that vault which a key will open. Not much risk to be sure, but some.

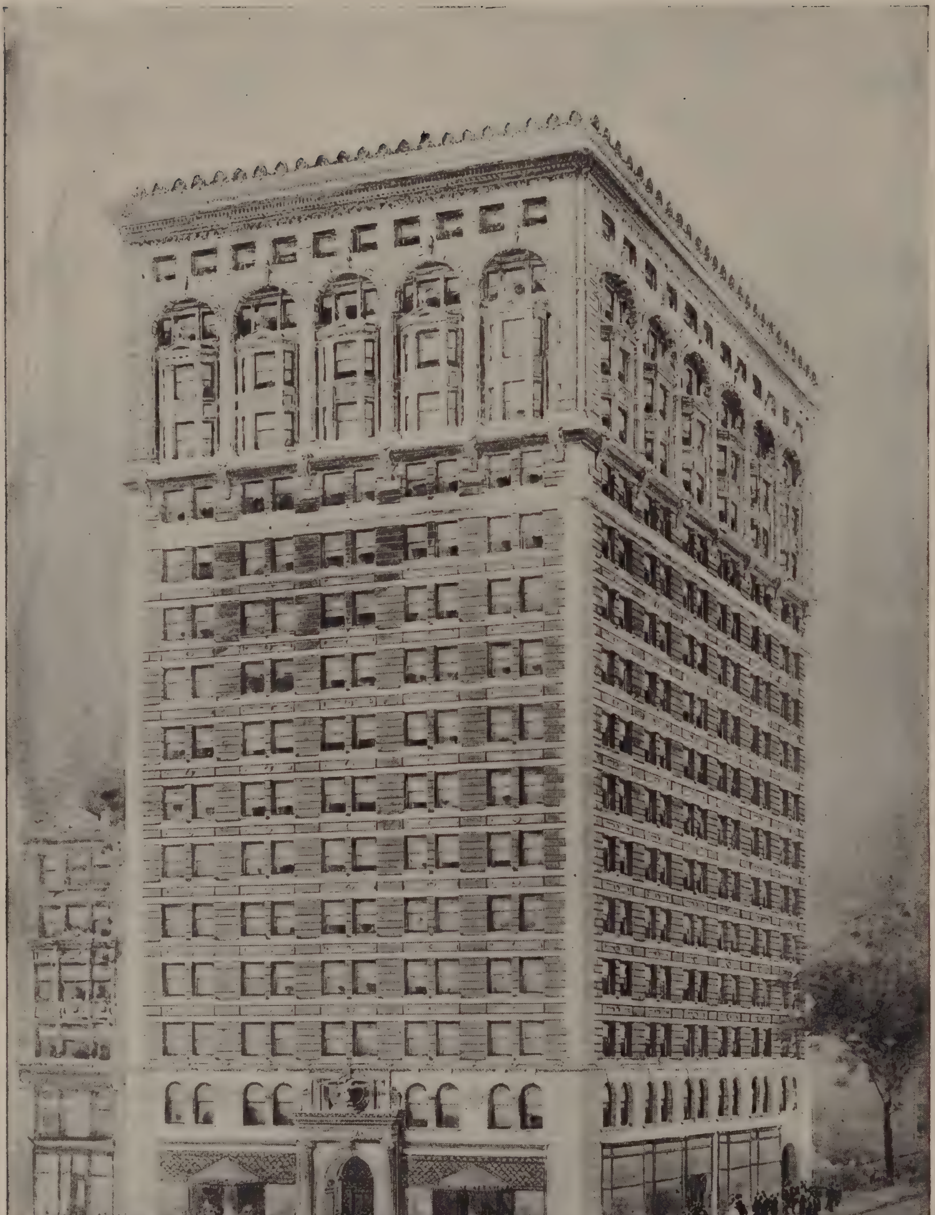
There must be provided a key closet in some corner of the vault, built like the safes themselves, and used to keep the keys of the unoccupied safes.

The doors of the safes are from half an inch to an inch thick of a plate of five-ply chrome steel, the larger, say above a square foot of face, provided with bolt work like any large safe.

The construction of these banks of safes is, so to speak, iron cabinet work, so great is the care and accuracy of fit required.

The details of the construction and the reasons for certain ways of doing things might be indefinitely elaborated. Enough has been said to give a notion of the requirements and accepted methods to one entering upon such work without previous knowledge of it.

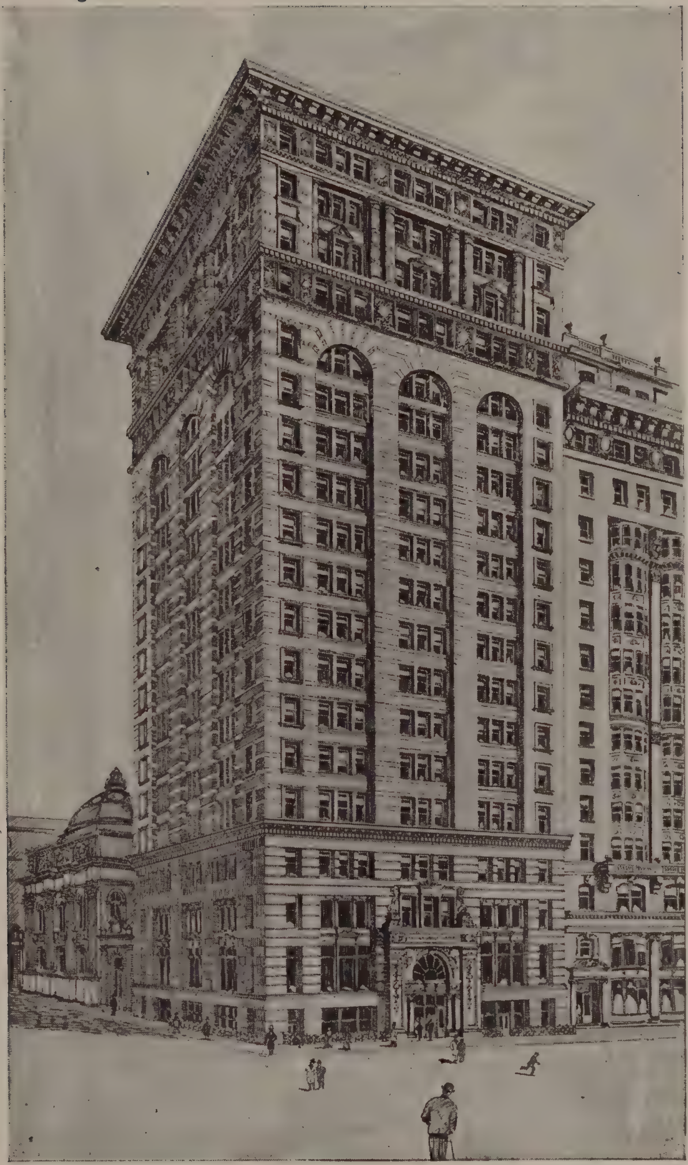
John Beverley Robinson



THE ST. JAMES BUILDING.

Broadway and 26th Street, New York City. Bruce Price, Architect.

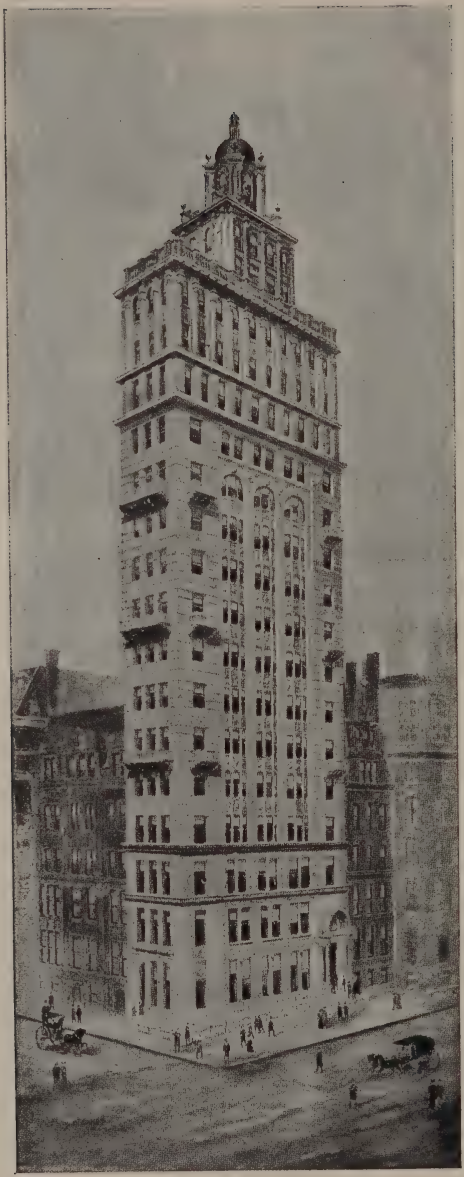
BOSTON PUBLIC LIBRARY



THE BANK OF COMMERCE BUILDING.

Nassau and Cedar Streets, New York City. Rowe & Baker, Architects.

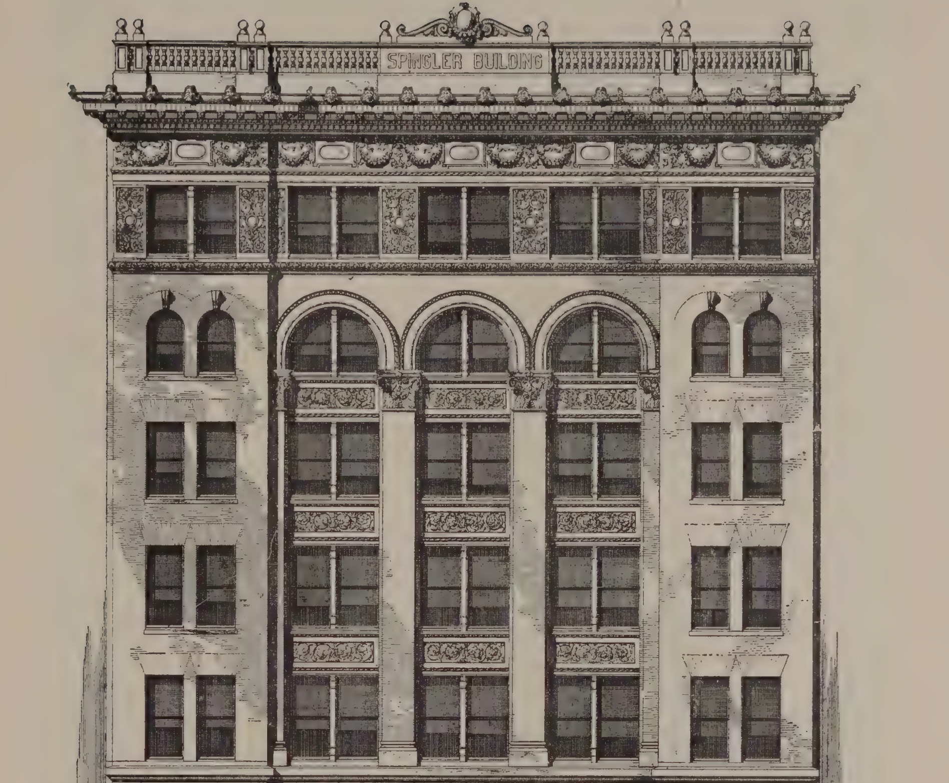
BOSTON PUBLIC LIBRARY



THE GILLENDER BUILDING.

Wall and Nassau Streets, New York City. Berg & Clark, Architects.

BOSTON PUBLIC LIBRARY



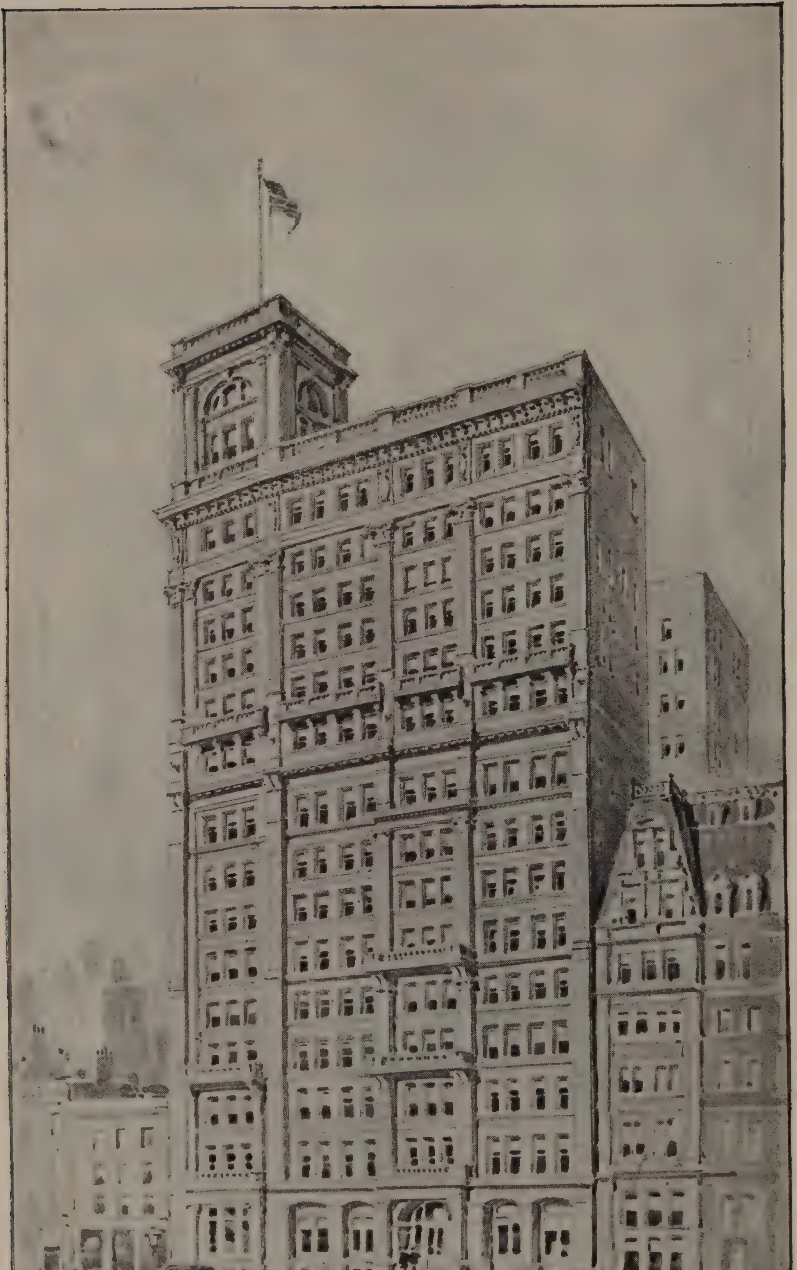
WIDTH 77'4½"
HEIGHT 134'6"

SPINGLER·BUILDING·

WM· H HUME·&·SON·ARCH'TS·.
LINCOLN·BUILDING·N.Y·

Union Square, New York City.

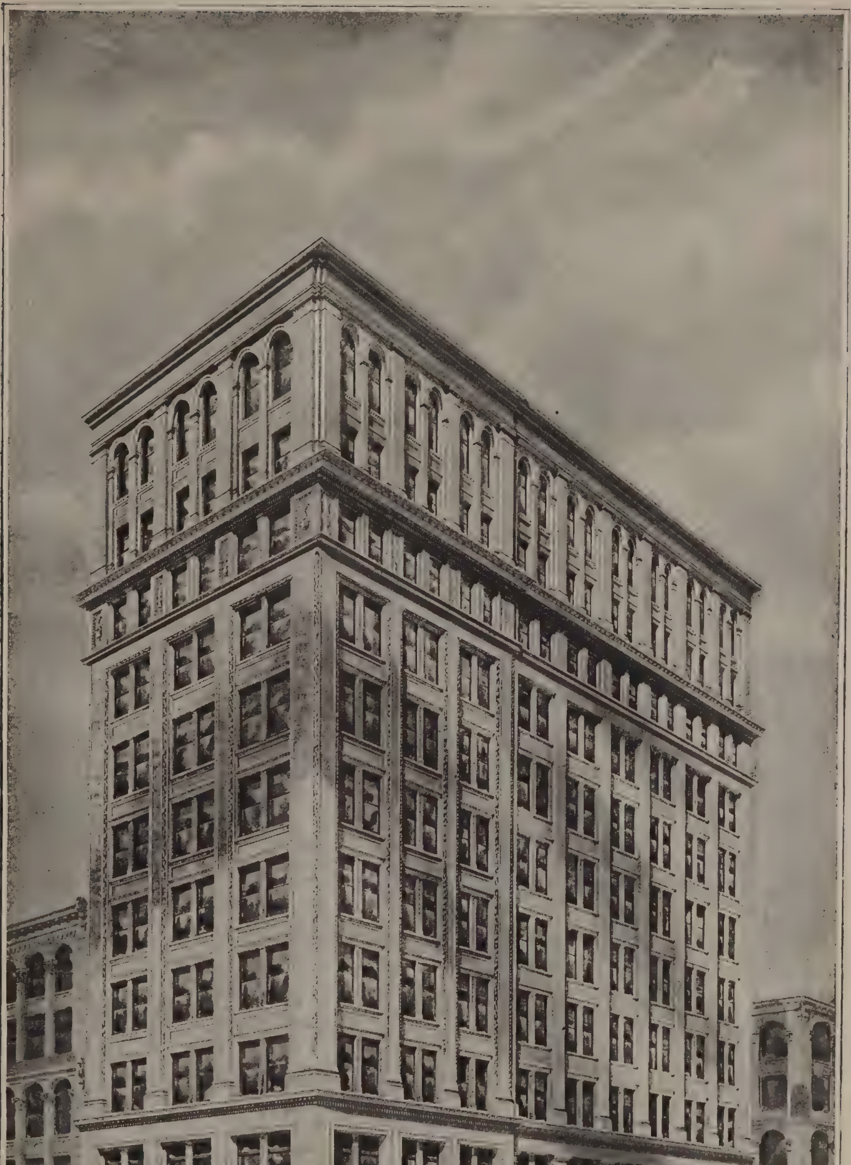
PUBLIC LIBRARY



STON
BLIC
BRARY

THE STANDARD OIL CO.'S ENLARGED BUILDING.

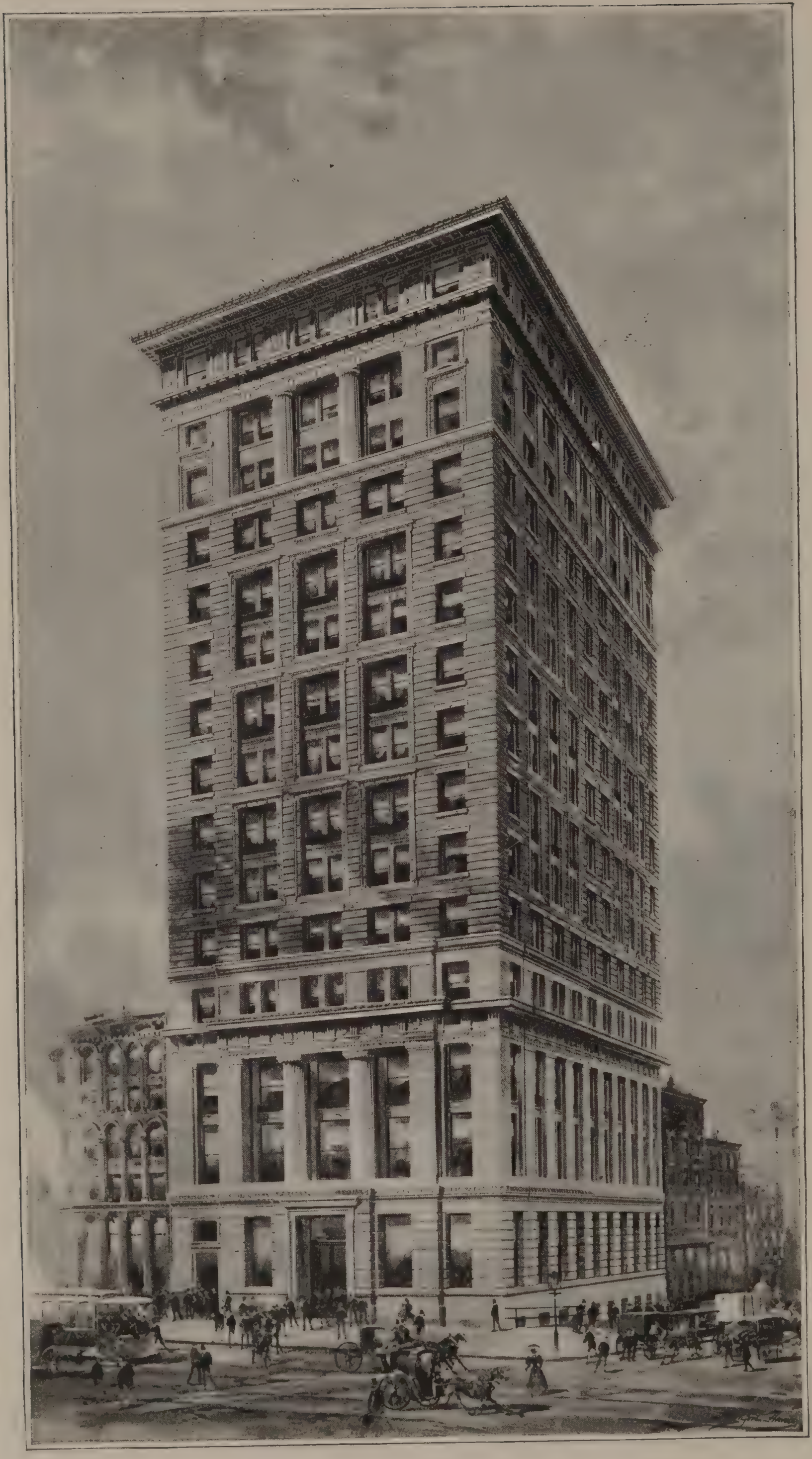
Lower Broadway, New York City. Architects, Kimball & Thompson.



OFFICE BUILDING.

Southwest corner Broadway and White Street. John T. Williams.

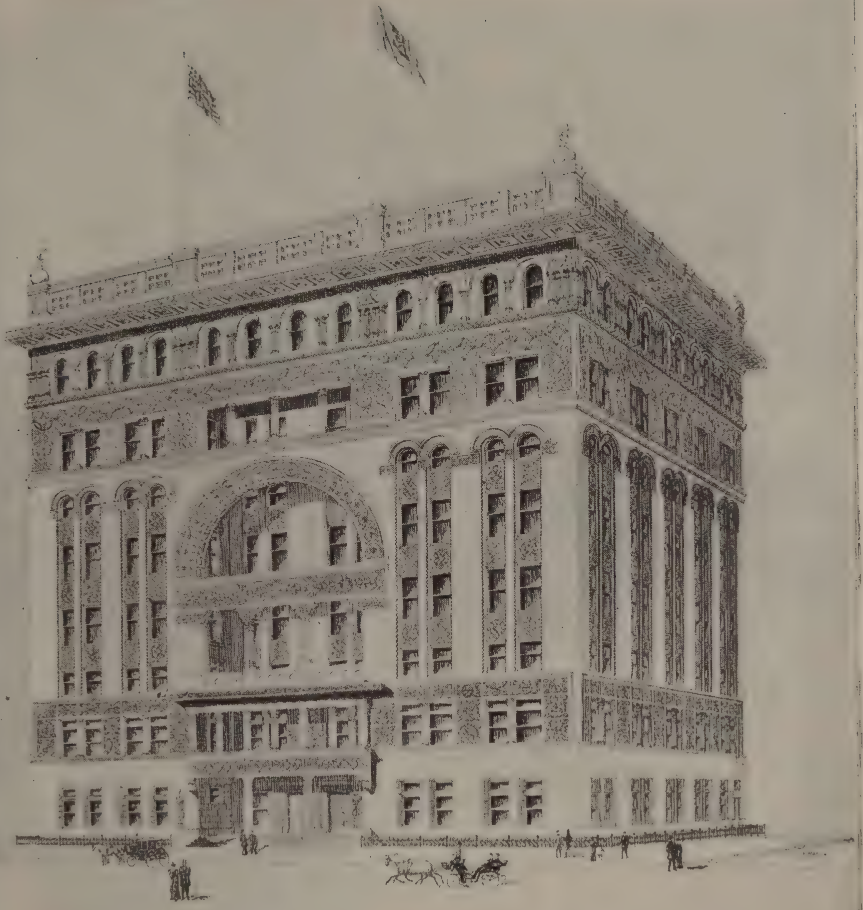
BOSTON PUBLIC LIBRARY



THE CENTRAL BANK BUILDING.

Broadway and Pearl Street, New York City. John T. Williams, Architect.

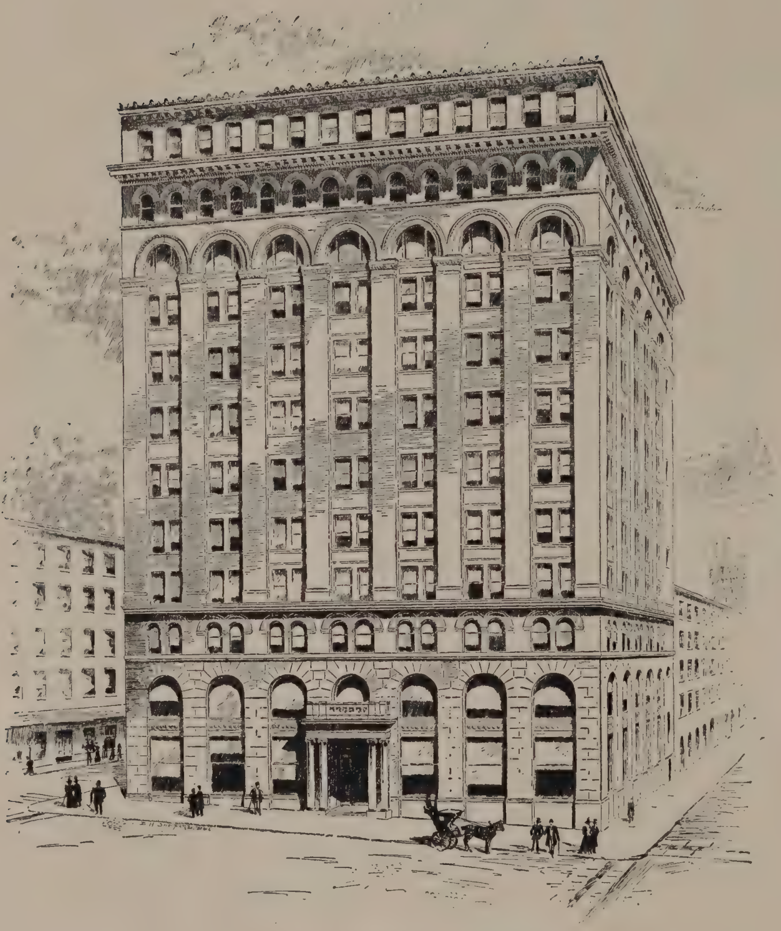
BOSTON PUBLIC LIBRARY



NEW YORK ATHLETIC CLUB.
cor of 59th St and 6th Avenue

Wm A Cable
. Architect.
1183 Broadway, New York.

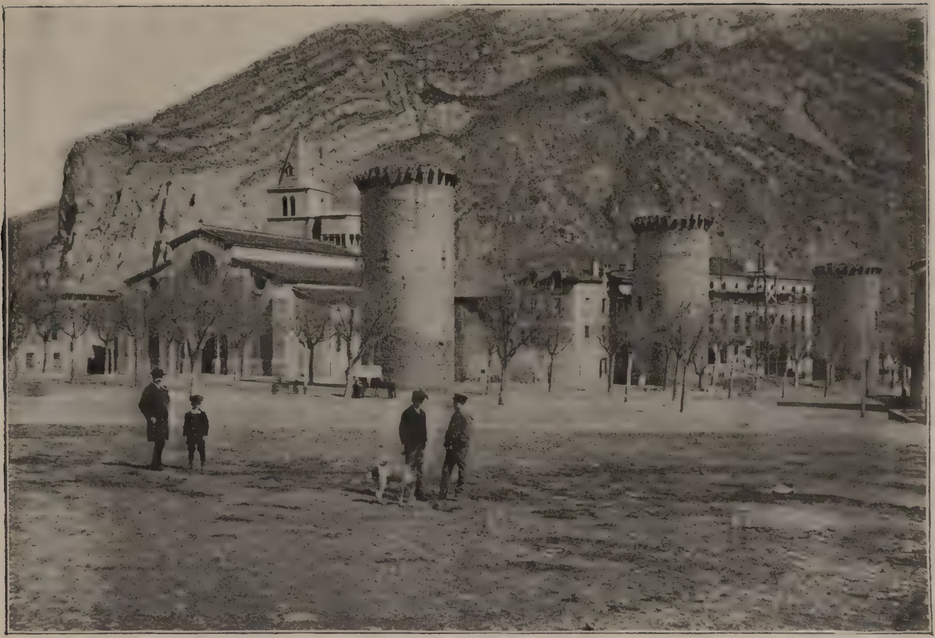
BOSTON PUBLIC LIBRARY



THE WOODBRIDGE BUILDING.

William, Platt and John Streets, New York City. Clinton & Russell, Architects.

BOSTON PUBLIC LIBRARY



CATHEDRAL OF SISTERON AND TOWERS OF ANCIENT WALLS.

FRENCH CATHEDRALS.

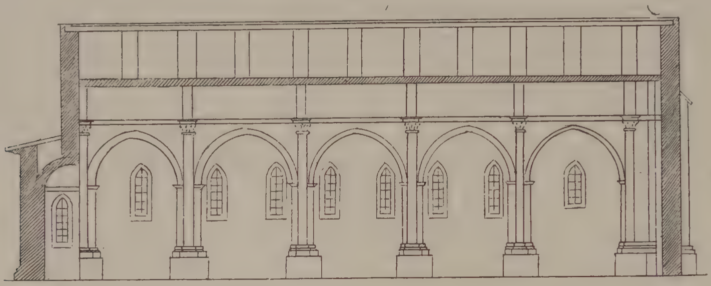
Part X.

THE CATHEDRAL OF PROVENCE. VI.

I.

WITHIN a limited area in the Department of the Basses Alpes is a group of three small cathedrals which have many points of similarity. While retaining, to a considerable extent, the plan and structure of the other Provençal cathedrals, they have characteristics of their own. I refer to the cathedrals of Sisteron, Digne and Sénez, and with them may be included the little concathedral of Forcalquier, whose portal resembles that of Sénez which, in its turn, is manifestly derived from those of Digne and Sisteron. None of these churches have detail of Roman character, though the influence of Roman motifs has not wholly disappeared from the cathedral of Sisteron. In the others, however, there is scarcely a suggestion of that rich art that flourished in Provence in the eleventh and twelfth centuries. They belong, therefore, to a somewhat later time than the cathedrals we have been studying, though the complete absence of any records renders their date a matter of conjecture. Of the cathedral of Sisteron it is stated that its reconstruction was begun in 1015 by bishop Frondon (died 1030); but the structure and the detail are manifestly so much later that it is impossible to believe that the present edifice is the one undertaken at that time. The second half of the twelfth century is certainly a safer period in which to place it.

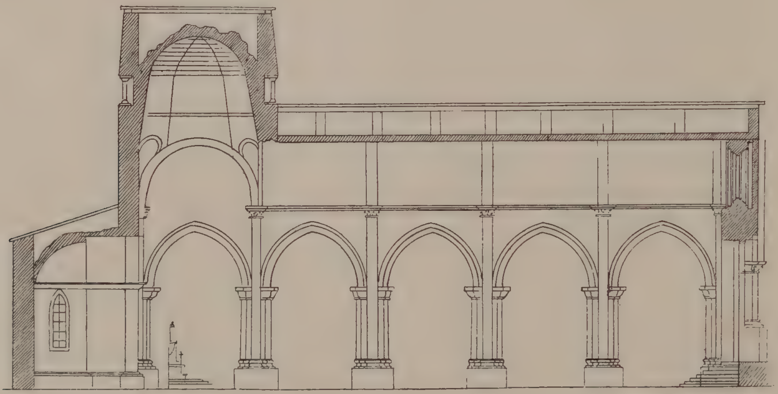
Sisteron is a city that enjoys the advantage of an extraordinary situation. Built on a rocky gorge on the river Durance, and surrounded by precipitous rocks, on the highest of which is one of the strongest citadels in France, its narrow streets, its ancient military remains, its curious old houses and its primitive aspect, give it an interest apart from its cathedral, and though seldom visited it is one of the most interesting cities in Provence.



CATHEDRAL OF SISTERON;
Longitudinal Section Through South Aisle.

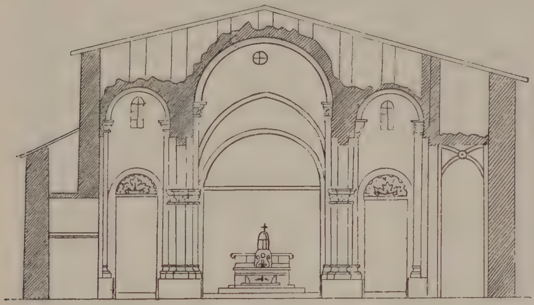
Its cathedral of Notre Dame de Pomeriis is the most important of the sub-Alpine cathedrals. Though small —its greatest length is 144 feet—its interior consists of a nave and aisles, with three apses, and chapels added at various times. The interior is of a very dark stone, almost black, and being lighted by but few windows, has a most impressive effect. There is a small tower at the east end of the north aisle, and a low octagonal lantern over the dome of the choir. Save the west front its exterior is plain almost to severity, yet it exhibits marks of Italian influence in its flattish gable and its main portal, which is almost identical with that of the cathedral of Notre Dame du Bourg at Digne.

The nave is of the Provençal type; four bays with tunnel vaults, a fifth bay with an octagonal dome, and an apse beyond. The vaults, however, depart from the usual form and are round instead of pointed as in earlier churches. They are carried on single vault arches resting on slender half columns applied to the centre of the large square piers separating the nave from the aisles. These piers are square in plan, with half columns applied to the centre of each face, all resting on a large unmoulded base, whose height



CATHEDRAL OF SISTERON;
Longitudinal Section Through Nave.

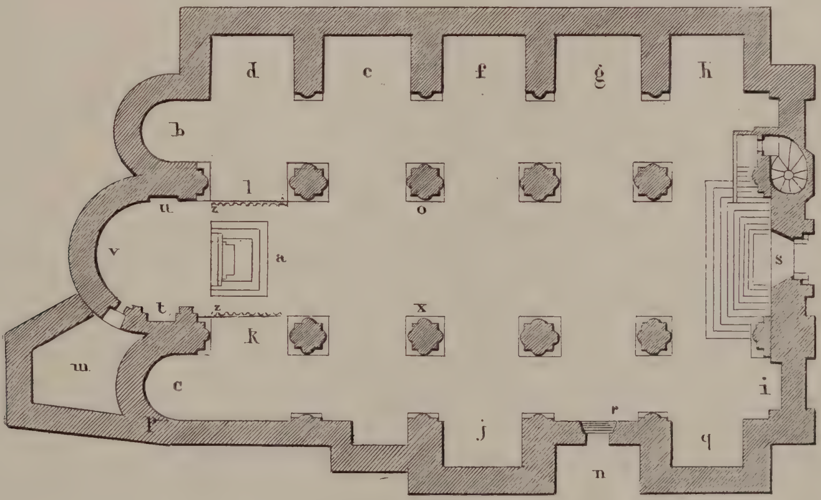
diminishes towards the altar. The capitals of the half-columns carrying the arches between the nave and the aisles are continued on the rectangular part of the piers to the half-columns of the nave vault, which rise above them. The first pair of columns have strongly conventualized foliage, while the others are of a plain swollen type. The arches opening to the aisles are double pointed and unmoulded, those in the first bay having a small hollow worked on the edge.



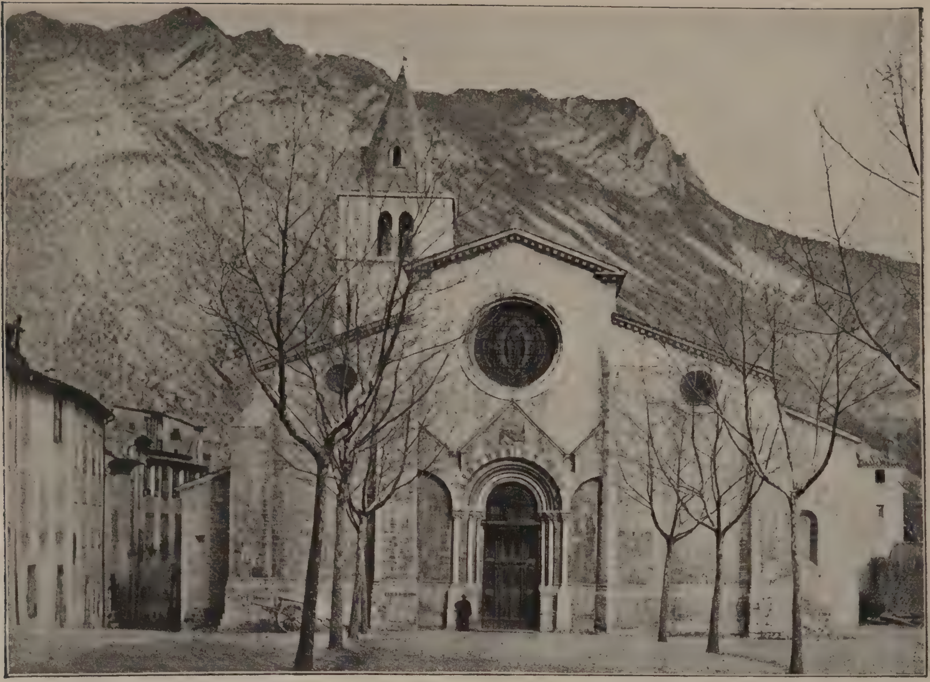
CATHEDRAL OF SISTERON;
Transverse Section.

The dome has some peculiarities of its own. The pendentives have somewhat long triangular bases and support the octagon without a separating string. It has an inward slope of a conical section, and a string a short distance up divides the dome, which is without ribs. The entrance arch of the nave apse is round, though all the other lower arches of the nave are pointed. A pointed arch in the wall over it is below a small round splayed window, over which is an open maltese cross cut in the wall. The apse is a short rectangular portion with a semicircle beyond roofed with a semidome, which is slightly lower than the tunnel vault or deep arch over the preceding part. The original structure of the apse wall is almost completely hidden by the altar piece and niches for statues (XVII. century); it is lighted by a round topped window on the south side, and on the north side at the entrance, is a large and interesting door frame in the Renaissance style now used as a canopy for seats placed below it.

The aisles are high and narrow, as is usual in the aisled churches of Provence. Like the nave they have round tunnel vaults with plain arches on half columns. The outer walls have single round arches, below which are the chapel entrances. None of these are of special note. On the north side



CATHEDRAL OF SISTERON;
Plan.



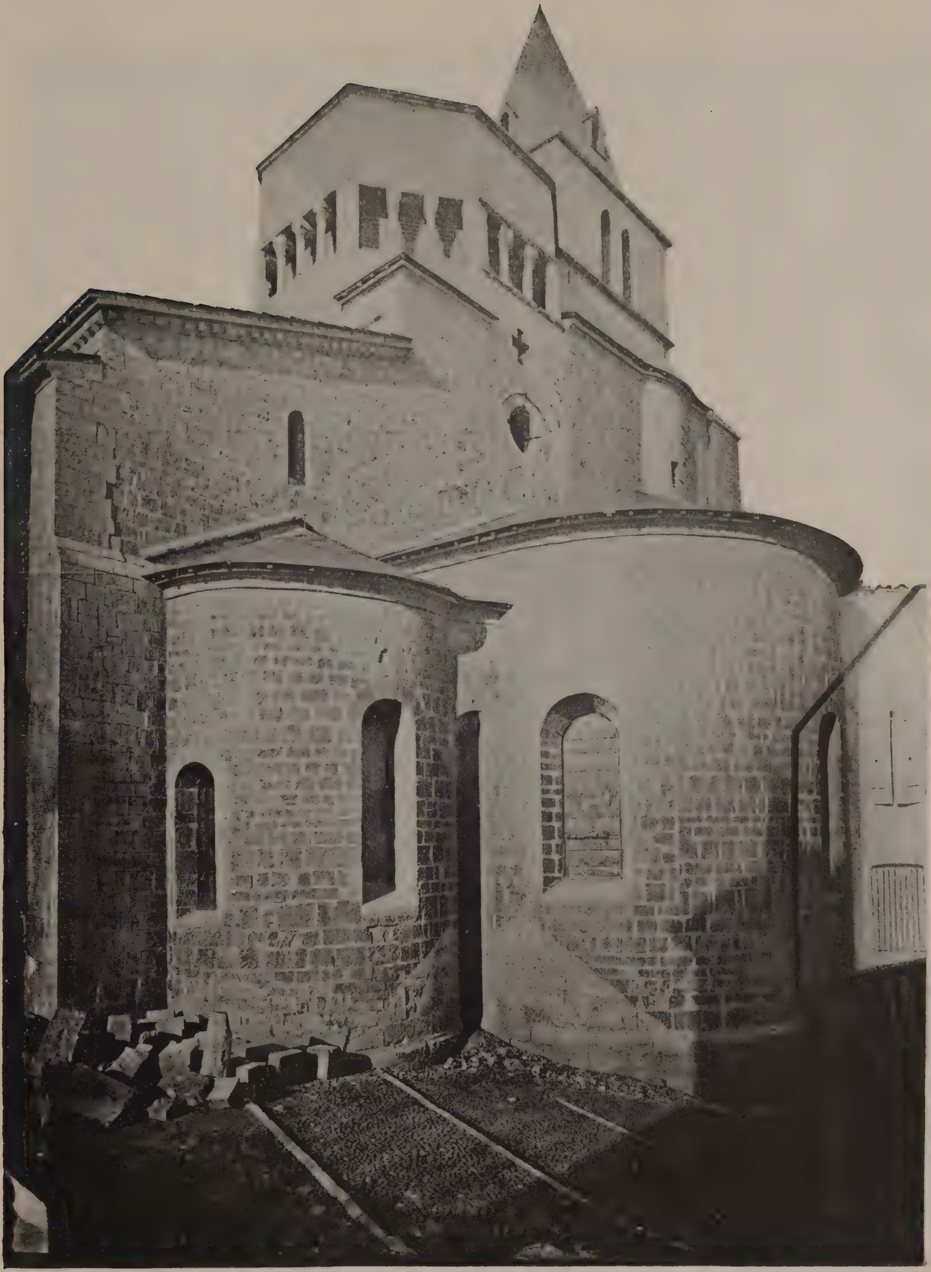
CATHEDRAL OF SISTERON.

Photographed by M. Eysseric.

they are of various depths, those of the first and fourth bays being scarcely more than recesses with tunnel vaults. The second bay on this side is the usual entrance, and entirely featureless, while the chapel of the third bay, which has a ribbed cross vault, is the only true chapel on this side. On the south the chapels have the merit of regularity, though not all built at the same time. The wall arches have disappeared in some bays, and save the second chapel all the entrance arches are large and clumsy. The ribbed cross vaults differ in minor particulars, and the windows are round or pointed, and arranged one or two to a chapel. The aisle apses are small and without ornament.

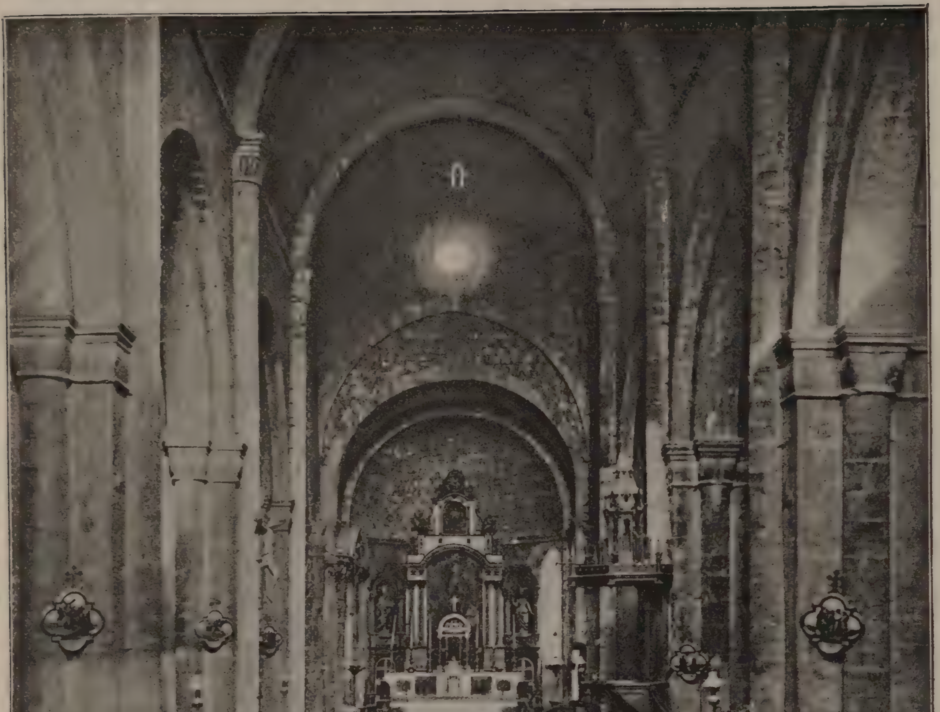
The exterior of the cathedral though plain is not uninteresting. The west façade has been restored, but carefully and judiciously. It is rather low, owing to the fact that the ground slopes downward behind it, the floor of the nave being nine steps below the ground. Four large buttresses, with sloping tops, divide the front into three parts, of which that to the right with inclined sides contains stairs to the organ gallery. In the upper part of each division is a round window, the central one larger than the other, and all with deeply splayed frames.

The portal, rather slender and high, consists of a round arch with a half arch on each side resting against the adjoining buttress. The half arches are single, while the central one is recessed with roll mouldings carried on two columns on each side. The structure is almost identical with that of the portal of the ancient cathedral of Digne, but there is an essential difference in the upper part, which is here inclosed with a pointed gable, with half gables over the half arches. A small bas-relief of an animal is inserted in the central gable over the arch. The columns are recent restorations, and are slender delicate shafts whose bases stand on a high base with a moulded top that run across the wall. The capitals, however, save those of the outer columns, are original, and their conventualized acanthus



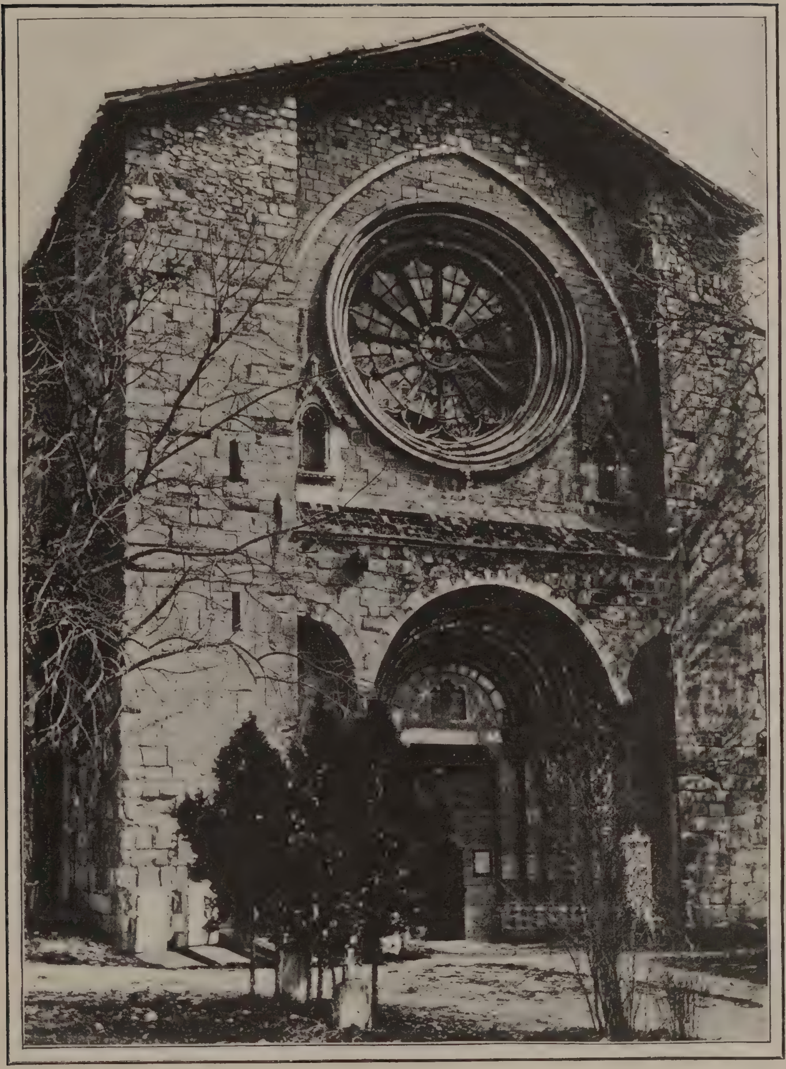
CATHEDRAL OF SISTERON.—EAST END.

BOSTON
PUBLIC
LIBRARY



CATHEDRAL OF SISTERON.—INTERIOR.

BOSTON PUBLIC LIBRARY



CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.— WEST FRONT.

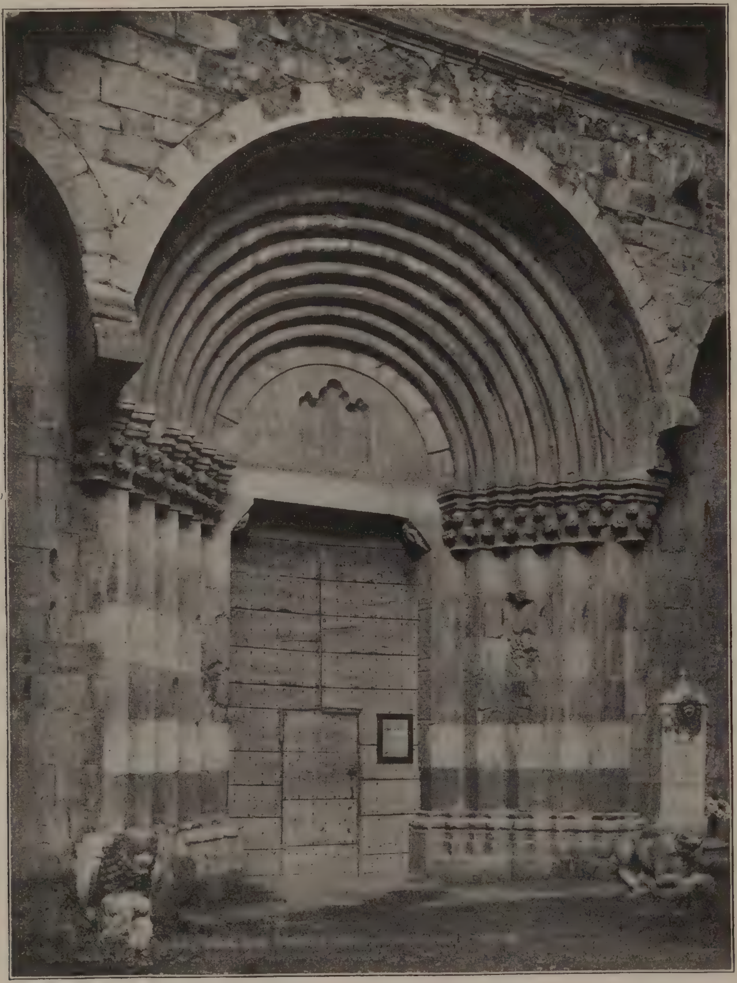
Photographed by M. Eysseric.

BOSTON PUBLIC LIBRARY

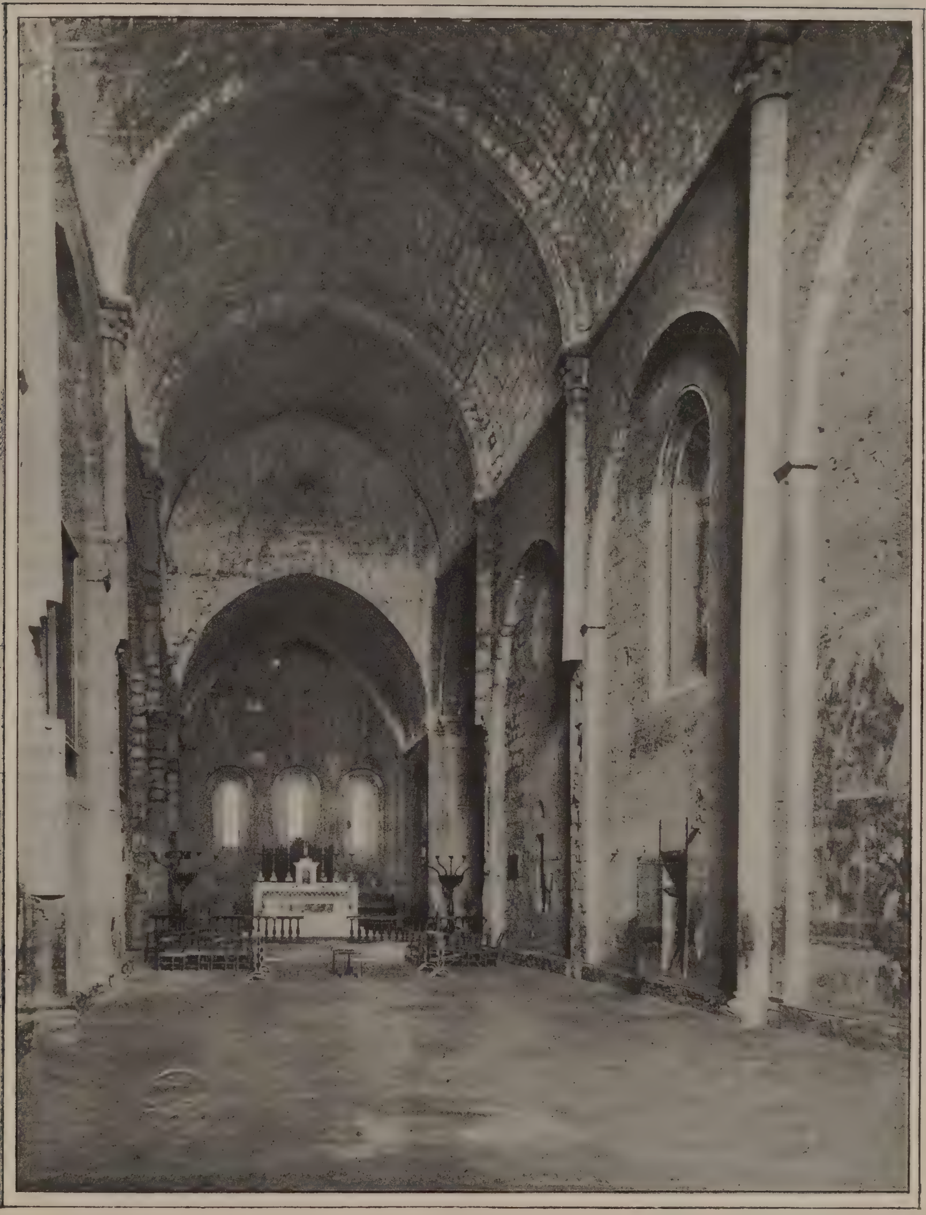
leaves indicate a considerable departure from the Roman type. The first arch within the portal rests on a pilaster, and has a somewhat broad capital with symbolic animals.

The other portions of the exterior are plain walls and unimportant buttresses. The tower is rectangular, its longer east and west sides having two small pointed windows in its upper stage, with one in the others. It has a low modern octagonal spire. Beyond the tower is the uninteresting sacristy and former chapter house, enclosing the north apse.

The eastern wall is as featureless as the sides. The apses are unornamented. The choir has no gable, but a portion of its end wall forms part of the base of the octagon which surmounts the dome. The latter is a loggia-like structure, with small piers on the corners and columns between them, with a passageway behind closed by a solid wall. A high piece of plain wall surmounts the loggia. The treatment is novel and beautiful, but the misshappen form of the eastern wall of the cathedral, the awkward effect of the adjoining tower, and the severity of

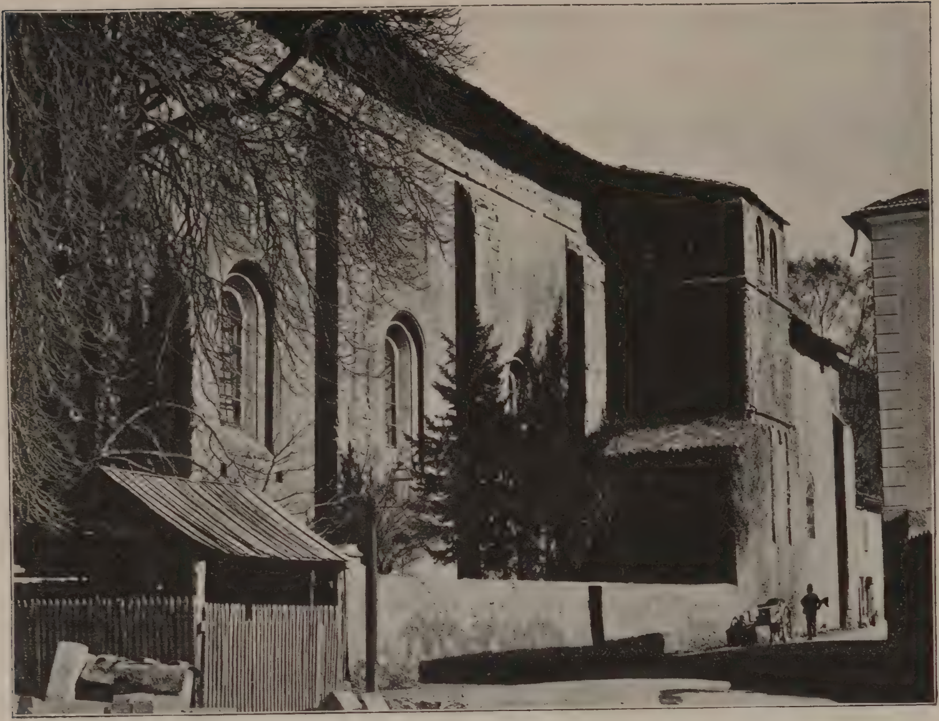


CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.—MAIN DOORWAY.



NAVE OF THE CATHEDRAL, DIGNE.

BOSTON PUBLIC LIBRARY



CATHEDRAL OF NOTRE DAME DU BOURG, DIGNE.—SOUTH SIDE, NAVE AND TRANSEPT.
Photographed by M. Eysseric.

every part, deprive it of those adjuncts of regularity and beauty which are essential to a fine effect.

II.

The city of Digne, the flourishing and busy capital of the Department of the Basses Alpes, has two cathedrals. The present cathedral of Notre Dame et S. Jerome is a Gothic structure of the fifteenth century. The old cathedral of Notre Dame du Bourg, on the outskirts of the city, dates from the twelfth century, in plan at least, though the whole of its upper fabric appears to be of the thirteenth, while the essential parts of the façade belong to the fourteenth. Even in its present dismantled and deserted state it is one of the most interesting monuments of the region. It is an excellent type of a simple form of Romanesque architecture, in which the direct reproduction of Roman-like ornament has disappeared, while the simplicity and regularity of its plan, together with the almost unique circumstance among French cathedrals that it is practically unrestored, make it more than usually valuable for comparative study, and a really delightful church to visit.

It is extremely simple: a nave of five bays, 165 feet long and 26 wide, shallow transepts of a single bay each, a short rectangular apse, a tower, and a sacristy—quite formless in its architecture—which, when it was built towards 1335, formed a chapel. And the construction is as simple as the plan. It has pointed tunnel vaults throughout, of the usual type, carried on double arches, but the supporting piers, instead of being, as heretofore, a group of rectangles, have the central or outer rectangle displaced for a half column. The capitals are clumsily carved and of a distinctively Romanesque type, with a heavy abacus that forms a string at the base of the vaults. This form is used throughout the church, in the aisles, at the opening of the transepts, and at the entrance of the apse, which, like the other parts, has also a pointed tunnel vault, though slightly lower than that of the nave. The nave wall is marked off by single arches, whose piers have plainly moulded capitals. There is practically no decoration in this interior, and even the windows are of the same severe character as the rest of the structure. On the north side there are none at all, but the south wall contains three, with splayed frames with roll mouldings. Three similar windows light the end wall of the apse, and larger ones the end walls of the transepts. Instead of apses the transepts have, in each eastern wall, a pointed recess, and in the south transept, in the west wall, is a doorway that opens to a small vaulted crypt under the tower, where the curious who need other things than cathedrals to interest them, mav see some particularly horrid mummified human skeletons.

It is, in truth, a strange and deserted little church, used only at certain festivals, and perhaps not now as its historians record was once the annual custom; for its ancient caretaker, to whom you must apply for the key, will protest against your removing your hat in its cold damp interior. It contains an altar, but it does not suggest use nor that loving care which might be looked for in so curious and ancient a building. There are some nearly obliterated remains of frescoes on the nave walls, dating from the fifteenth or sixteenth centuries. The most interesting is a Last Judgment on the south side, which, though much defaced, is still legible.

Of the exterior there are but two parts that show architectural treatment, the façade and the tower. The west front, which has been repaired in our own day, though scarcely more than was necessary to keep it intact, is enclosed within two huge buttresses. The central part is divided horizontally into two nearly equal divisions, of which the lower is formed by the porch, which, as has been pointed out, is very similar to the main porch of the cathedral of Sisteron. It consists of a deeply recessed arch with large roll mouldings; the columns which supported it have disappeared, but the capitals remain. The outer arch, plain and unornamented, is continued on each side by a single half arch that rests against the enclosing buttress. A projecting stone between the junction of the main and half arches was formerly supported by a column standing on the back of an archaic lion. The lions are still in place, but the columns have disappeared. Above the arches is a plainly moulded string, with two corbels below which were doubtless part of the original finish of the porch. It is completed by a narrow sloping covering. This porch was repaired in the fourteenth century, at which time the capitals were put in place. This was probably prior to 1330, at which date a consecration of the church took place.

Above the porch is a large circular window, with a broad frame of rolls and hollows, which are repeated within, and which is evidently of the same date as the portal. The thin pointed arch of the nave vault appears on the outer wall over it, the space above, under the flat pointed roof, being filled in with stone-work that has partly fallen away and been roughly restored. Below, on each side, is a small niche of the fourteenth or fifteenth century, that to the south containing a statue.

The north wall is entirely plain except for the top of a pointed door-frame and the flat buttresses, which are stopped with a slope below a string that runs along the wall, a system we have seen in the cathedrals of Vaison and Cavaillon. The roof—a bare covering—is carried on a rough piece of wall above.

On the south side the wall is in better shape. The buttresses are the same, but the nave windows have moulded frames as within. The tower, which lost its spire in 1568, adjoins the west face of the south transept, and, with the exception of the main portal, is the most interesting feature of the exterior. Various dates have been assigned to it, some authorities dating its lower part as a gallo-Roman wall of the sixth and seventh centuries, repaired in the ninth, while the upper stages are placed in the tenth century. These dates are certainly too early, for no other portion of the church goes as far back. But the lower stage, whose south face is decorated with two pairs of small round arches with a central corbel, and which is built of small stones, is unquestionably earlier than the two upper stages, built of largish smooth stones, and of which the first is solid and plain, with an applied columnette on the corners—with capitals too small for the columns and apparently from another structure—and the upper with two round arched windows, with triple recessed frames, without ornament; a construction which appears to date from the epoch at which the cathedral was built, and probably completed in the twelfth century. The lower part of the west wall of the tower has a shallow projection, nearly in ruins, with a small window that lights the crypt below.

Barr Ferree.

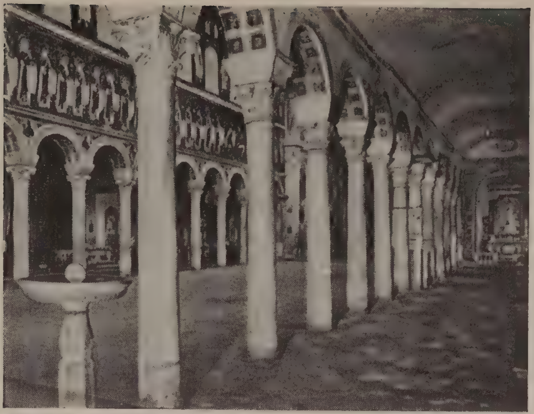


Fig. 1.—S. Apollinare Nuovo, Ravenna (6th Century).

A DISCOVERY OF HORIZONTAL CURVES IN MEDIEVAL ITALIAN ARCHITECTURE.

I.

THE announcement that the refinement of curving horizontal lines, hitherto generally supposed to be restricted to the temples of the Greeks, has been discovered in Medieval Italian cloisters and churches is doubtless open to preliminary suspicion and scepticism. The facts, however, appear to be firmly established by the Brooklyn Institute Survey of 1895,* and what these facts are it will be the purpose of the present article to describe.

Inasmuch as scepticism and incredulity are to be anticipated, it may be well to disarm them in advance, as far as possible, by some preliminary explanations. These will take the shape of a reminder that our knowledge of the uses and purpose of curves in ancient architecture is at present extremely limited and fragmentary.

The general and practically universal presumption is, at present, that these curves were all rising curves in vertical planes and that they were confined to Greek temples. The mention of the curves is generally confined in popular works to the Parthenon at Athens and the presumption that they were intended in the Parthenon to produce the effect of exactly straight lines by counteracting certain optical appearances of sagging and downward deflection, is also a very general one in the rare mentions of the subject by English or American experts.

As long as the account of the Greek curves is mainly confined to the Parthenon it does undoubtedly appear improbable that a refinement considered specially characteristic of this marvellously perfect building should be found in Medieval work, separated by many centuries from the Greek culture of the fifth century B. C. As long as the presumption is general that the Greek curves were always curves in elevation and always intended to correct an optical downward deflection, so long the existence of curves in Medieval architecture, which could not have had this purpose, is open to suspicion.

It seems, therefore, wise to stress the importance of an article which appeared in the "Architectural Record" in the Spring of 1895, as bearing on the announcements of the present Paper,* and to urge a review of this former article, by any one who is disposed to subject these later announcements to critical investigation.

---

*For a preliminary account of the work of this Survey, see Vol. VI., No. 1.

*Vol. IV., No. 4. "The origin of Greek horizontal curves." This article has been republished by the Smithsonian Institution in the "Smithsonian Report for 1894"—the actual publication dating 1896; under the title of "A Discovery of Greek Horizontal Curves in the Maison Carree at Nimes," pp. 573-578.

It was shown by this article that the prominence given to theories of optical correction in the matter of the Greek curves, on the part of English and American experts, is due to their natural respect for the high authority of Mr. Penrose, who has especially developed this explanation in dependence on the account given by the Roman author Vitruvius. (But Mr. Penrose, be it observed, in the first place, does not offer his explanations as to optical correction as final, or as more than tentative. In the second place he suggests additional explanations of a Greek preference for the beauty or variety of the curving line as alternative or additional causes.) It was also shown by this article that the curves in plan (as distinct from curves in elevation) on the flanks of the Neptune Temple at Paestum were unknown to Mr. Penrose,* that such curves are also found in the Roman temple at Nîmes known as the Maison Carrée and in the court of the Egyptian temple at Medinet Habou. It was shown moreover that the curves at Medinet Habou were discovered by Mr. Pennethorne before he made the discovery of the Parthenon curves and that this Egyptian discovery actually led to the other; in spite of which fact the Egyptian curves, which are curves in plan and not in elevation, have never been considered as an element in the problem of purpose—because their existence has been overlooked and ignored. The curves in plan which have just been mentioned have not been considered in the theories of a purpose of optical correction, and the facts are outside of these theories.

It is a natural tendency of popular writers to restrict their mention of Greek refinements to the curves, to restrict their mention of the curves to the Parthenon, and to restrict their mention of the probable explanation to the one which is best known to them.

Lest popular readers should be misled by this tendency of popular writers, lest us accent the following points as important to our own account of curves as found in the buildings of Medieval Italy.

(a) The Greek refinements were not confined to curves. They included constructive asymmetry in apparently equal dimensions, of all members and spacings. They included an avoidance of all parallels in verticals as well as in horizontals. (Even the curves do not have the same amount of deflection on the stylobate which holds for the entablature.) These refinements consequently included an avoidance of all exactly perpendicular lines in favor of constructed leans, both outward and inward. (These facts are also found in the buildings of Medieval Italy, as being due to construction and not to accident or carelessness. See article preceding and the article to follow.)

(b) The curves of ancient architecture are not confined to Greek temples. They are also found in Egyptian and in Roman temples.

(c) The curves of ancient architecture are not confined to curves in elevation, but they also include curves in plan. This holds even of the Parthenon, although no authority known to me has mentioned the curves in plan of the alignment of the portico columns of the Parthenon aside from Burnouf.* They are convex to the exterior.

(d) The theories of optical correction, as explaining Greek curves, are best known to readers of English publications, but they are not favored by Boutmy,* the leading French authority on this subject, nor by the German art historians like Jacob Burckhardt and Schnaase.

(e) Neither Penrose nor any other authority has ever antagonized the view that an effect of "life" and beauty was one purpose of the Greek curves, and Penrose has expressly mentioned this explanation.

---

*These curves were photographed by the Brooklyn Institute Survey in 1895.

* "Revue de l'Architecture," 1875, p. 152.

* "Philosophie de l'Architecture en Grece." This work has been recently republished with a new title, *Le Parthenon et le Genie Grec.* Armand Colin et Cie., Paris.

(f) It may also be mentioned that two authorities, Hoffer and Boutmy, (to whose names we may add that of the American artist Stillman) have supposed the purpose of the Greek curves to have included that of exaggerating dimensions by artificial effects of curvilinear perspective. Artificial effects of perspective were certainly intended by other devices used in Medieval Italian churches* and there are, in Italian churches, some cases of bends in elevation (if not of curves) in which a purpose of perspective exaggeration seems to be clearly involved.

II.

Many or most of the Medieval Italian horizontal curves are found in the Italo-Byzantine or Byzantine-Romanesque churches. None of the horizontal curves have been found in the Italian Gothic, excepting in cathedrals like those of Siena and Orvieto, which in other details, and in recorded history, have affiliations with Pisan influences and artists and consequently with the Byzantine-Romanesque. Outside of the Fiesole Cathedral (Romanesque) most of the important instances of horizontal curves have been found in centres like Ravenna, Venice, Genoa, Pisa and Lucca (an art dependency of Pisa). This is suggestive of historic continuity through Greek Byzantine art and of a historic connection with classic architecture.

It would thus appear, as a consequence that later Greco-Roman Antiquity made a wider use of these refinements than has been supposed. In fact, on the instant that curves are conceded to have been used in the Italo-Byzantine architecture, the conclusion will be inevitable that it is only the general destruction of the monuments which has obliterated the connecting links between the use of the curves as found at Nimes in the 2d century, A. D., and their use as found at Ravenna in S. Apollinare Nuovo in the 6th century A. D. This gap is not much greater than that which exists at present between the curves of the Maison Carrée and those of the temple of Olympian Jupiter at Athens (dated by Penrose to 174 B. C.) or between these last and those of the Parthenon. The gap is not nearly as great as that which now separates the curves of the Neptune temple at Paestum (6th cent. B. C.) from those of Medinet Habou (13th cent. B. C.).

Aside from a list of the Medieval Italian buildings in which curves have been observed and an account of their appearance, it is necessary to show the possible sceptic that thrust of vaultings or arches or other accidental causes could not account for them. It is also necessary to show that careless building could not explain them.

We will begin our list with Ravenna, because the sixth century church of S. Apollinare Nuovo is the earliest one in which the Medieval curves have been noticed (Fig. 1). The ascendency of Greco-Byzantine influence in this church is, of course, undisputed

In S. Apollinare Nuovo the lines of the nave columns supporting the clerestory are arranged in parallel curves in plan, of about six inches deflection at the centre from a stretched line. The curve is convex to the nave on the right side of the church and concave to the nave on the left side (looking toward the choir). These curves continue in the clerestory walls up to the ceiling. There are no aisle vaultings in this church to exercise thrust, and if there were, one of the curves would be against the thrust. The nave is timber-roofed, as was always the case in the early Christian basilicas of Italy, and the arched ceilings of the aisles are Renaissance lath and plaster. This is visible through an unrepaired break in the ceiling as one ascends to the organ loft, by a stairway from the right aisle. The best place to sight for the curves of the walls is from this organ loft. The walls of this church retain the original sixth century mosaics, and this is the only case in Europe of an early Christian basilica which has retained its side wall mosaics. This is a fortunate point for our observation, because if the walls had moved, the mosaics would have dropped off or would have been badly damaged; but no one will seriously suggest a movement of the earth's surface or any accidental displacement of masonry as having moved both lines of columns, from the pavement up, and both walls, up to the ceiling, into parallel curves in plan. These curves were discovered on Oct. 14th, 1895, after Mr. McKecknie's five months' time had expired and after he had left Italy. Consequently no photographs were taken here. The measures as given below were taken to a straight line. On the left side of the church this line was stretched tightly from the first column to the last, on the side toward the nave, and the measures, in inches, begin at the entrance.

---

* "Architectural Record," Vol. VI., No. 2, "Perspective Illusions," etc.

0.0, 2¼, 3, 4½, 5, 6, 4, 2¼, 1½, 2½, 0.

According to these measures the curve, concave to the nave, is strongest at the centre and is unbroken with exception of the placing of the tenth column. On the right side of the nave a line was stretched on the nave side of the columns at a distance of six inches from each of the two end columns. Thus the measures below, as they decrease toward the centre, indicate a curve convex to the nave, which is strongest at the fourth and fifth columns from the entrance and which is regular, with exception of a bend at the tenth column. The same bend occurs in the case of the same column on the opposite side. See the measures below, which begin at the entrance:

6, 5⅝, 3¾, 2, 2, 2⅞, 2⅞, 3⅞, 4¾, 7⅛, 6¼.

Fig. 1 is taken from an ordinary photograph and does not sight on the curve, which in the given aisle is convex to the nave; but it illustrates the survival of the wall mosaics in the nave and the general appearance of the church.

We will now rehearse the facts already mentioned which bar out the suggestion of accidental movement. (a) The curves start at the pavement in the alignment of columns and the measures are taken at this level. (b) There are no vaultings in the church, the aisle ceilings being Renaissance lath and plaster. (c) The curves are parallel as regards direction and if a "thrust" could be imagined as having ever existed in the building one of the two parallel curves must have been counter to the thrust.

It is generally conceded by experts that curves in masonry construction must be due to constructive purpose, unless they are due to thrust. This view is explained by the obvious point that careless or rough building might produce a "wobble" or an irregular line, but that it could not produce a curve. The thrust which produces a bulge or curve can only be exercised by a vaulting of masonry and it does not operate in timber-roofed buildings. In all vaulted churches the push or thrust of the vaultings against the supporting walls or piers is greatest at the centre of the building, because at the ends of the thrust the vaulting is tied in by transverse walls. Hence there is a tendency in the thrust of the vaulting of a side aisle to bulge out the wall of the clerestory toward the centre of the church. Otherwise a curve in masonry must be produced by a gradual and delicate series of changes in direction, all tending at first in one direction and all tending subsequently in a contrary direction. Such an arrangement implies contrivance and the effort of the human will, as a matter of course. When the curve "in plan" of a clerestory wall starts in the alignment of a series of columns, the conditions of the problem are the same. In the case of one line of columns the chances against an accidental arrangement in a curve, due to carelessness, are the same which hold against drawing a sequence of numbers first in a regularly rising and then in a regularly descending scale, and where two lines of columns are in question, of which each one shows a deviation from the rectilinear line of the same general character and direction, the chances against accidental arrangement, due to carelessness, are so increased that the certainty of a constructive purpose is fairly established. The doubts which may still cling, in spite of all probabilities, to a single case, where the consequences involved are revolutionary for the present attitude and knowledge of the art historian, ought to disappear in face of such a series of observations as will follow.

Meantime it may be suggested that scepticism, even for one case, must be consistent with itself. If it could be even suggested that the phenomena in S. Apollinare Nuovo were accidental, it would follow that the masons of the given church and the given city, at the given time, were unfamiliar with the method usual in building a straight wall, of stretching a line, and building to it. How then could it happen that the outer walls of S. Apollinare Nuovo are perfectly straight, which is the fact?

If again it should be assumed that these parallel curves are due to Medieval carelessness, how can it be explained that the columns of S. Apollinare in Classe, another sixth century Ravenna church, are placed in perfectly straight lines. The measures in this last church for widths of nave and aisles, as compared at the two ends of the church, show accurate building in the right aisle to a hair's breadth, accurate building in the nave with an error *of only two centimetres*, accurate building in the left aisle, with an error of *only five centimetres.* These errors do not specify a deflection of straight lines, resembling a curve, but they relate simply to differences in width at opposite ends of the building and in measures which were intended to be equal. They may be regarded, therefore, as establishing for this church the limit of error due to ordinary causes.

As I am not able to publish photographs sighting on the wall curves of S. Apollinare Nuovo for reasons explained above, it is well to say that they are of regular and even construction. This is implied by the existence in this church of the before-mentioned mosaics. Byzantine artists are at least free from the suspicion of making mosaics with an uneven surface. In other words, the well-known fact that the mosaics are here verifies my assertion that the curves of the walls are even and regular. The expert who wishes to test my observation for curves in the clerestory walls of S. Apollinare Nuovo should make use of the organ gallery over the entrance, from which point of view the most satisfactory sightings are obtained for the upper walls of the church. The photographs published in this article for other churches give a correct idea of the nature of these curves.

The church of S. Donato in Genoa (11th century Byzantine-Romanesque) shows regular parallel curves, with a deflection of six inches, in both lines of nave columns, beginning at the bases and continuing in the clerestory walls to the height of the ceiling. These facts were noticed by our party of three on the first day we spent in Italy, on landing at Genoa; but the measures were not taken until a second visit to Genoa, after Mr. McKecknie had left Italy. They were then taken on a Sunday, shortly before Mass, and consequently in a hurried way, as regards details, but with perfectly satisfactory results.

A cord was stretched in the left aisle, 4½ inches out from the column nearest the entrance and 5½ inches out from the column next to the choir. The nave is thirty-five paces long and there are seven columns. The measures at the first and last column show the points at which the cord was stretched and must be subtracted from the other measures to obtain the amount of curve.

4½, 6, 7½, 10½, 10¼, 8¼, 5½.

There is no break in this scheme, the measures show a curve of about six inches convex to the nave (the line being on the aisle side). On the opposite side a pulpit interfered with taking measures, but the facts are the same. There are two witnesses besides myself for the existence of the curves in the clerestory walls of this church, Mr. Nelson Goodyear and Mr. John W. McKecknie.

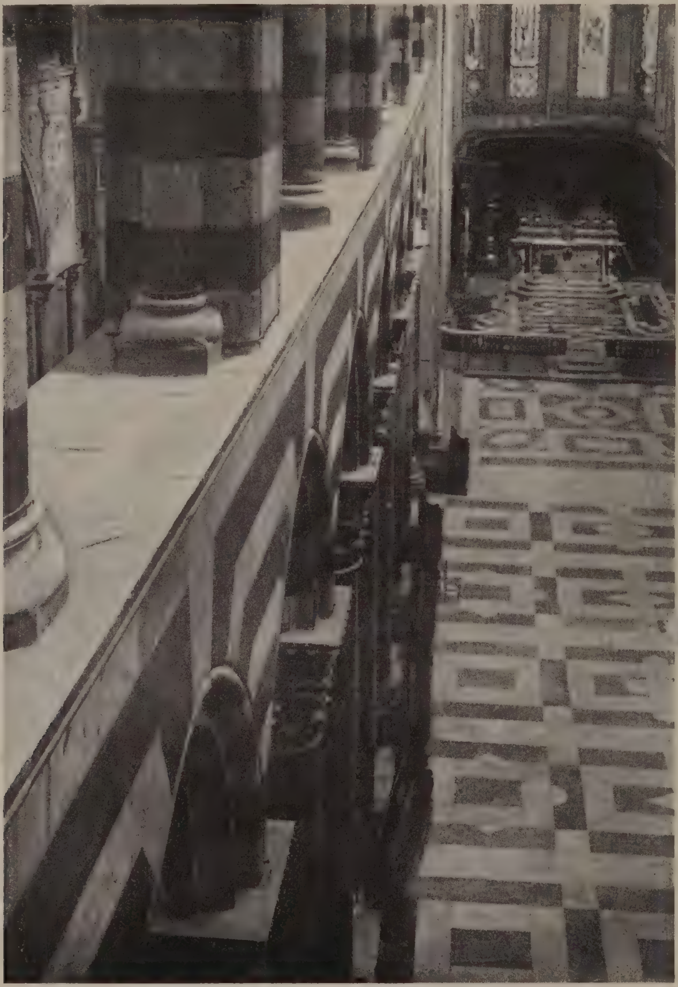


Fig. 2.—CURVE IN PLAN, CATHEDRAL OF GENOA.

The curve begins in the columnar alignment at the level of the pavement, and has an upper deflection of about eight inches.—Brooklyn Institute Survey.

As to the general delicacy of these curves in the upper walls of the given buildings a photograph taken in the Genoa Cathedral by Mr. McKecknie on the first day of our survey in Italy will be of interest (Fig. 2). The phograph was taken from the organ gallery above the entrance, sighting down on the curve. There are no partings of the masonry joints; the curve is delicate and regular and it starts in the bases of the columns at the pavement. It is much more pronounced on the line photographed than it is at the pavement, but the aisle vaulting could not have produced this increase, being too far above it.. The curve has about eight inches deflection, according to Mr. McKecknie's estimate, on the line photographed. The deflection in the line of columns at the pavement is about two inches. The curve would be much more apparent in the picture if it had been possible to place the camera farther to the left and sighting more directly on the line.

No curve could be noticed in the opposite clerestory wall of the Genoa Cathedral.

It is also the case at Trani that only one wall is curved. Here also the curve starts in the bases of the columns and here also it increases in the upper wall. Our photograph at Trani was so successful that it is repeated here from the first article of this series (Fig. 3). By Mr. McKecknie's measure the columns are placed in a curving line of five inches deflection at the bases and in the upper wall the curve increases to over a foot deflection, by Mr. McKecknie's guess. The survey also possesses a photograph sighting of the curve at Trani along the line of the bases of the columns.

Mr. McKecknie's survey of the Fiesole Cathedral (twelfth century Romanesque) deserves the close attention of the expert (Fig. 4). Our photographs here (made under many disadvantages) were less successful in showing the facts which actually appear by sighting, but as seen by the eye the curves at Fiesole are more remarkable than any so far mentioned; having a deflection of about twelve inches, and they are attested by the extremely careful and accurate survey, published herewith, as well as by the eyesight of three observers. The curves are *parallel returning curves* (Hogarth's "line of beauty") on both sides of the church, starting from the bases of the piers and rising in the walls to the ceiling of the church. The extreme deflection of the line of the piers from a straight line at the bases is about a foot. We have here

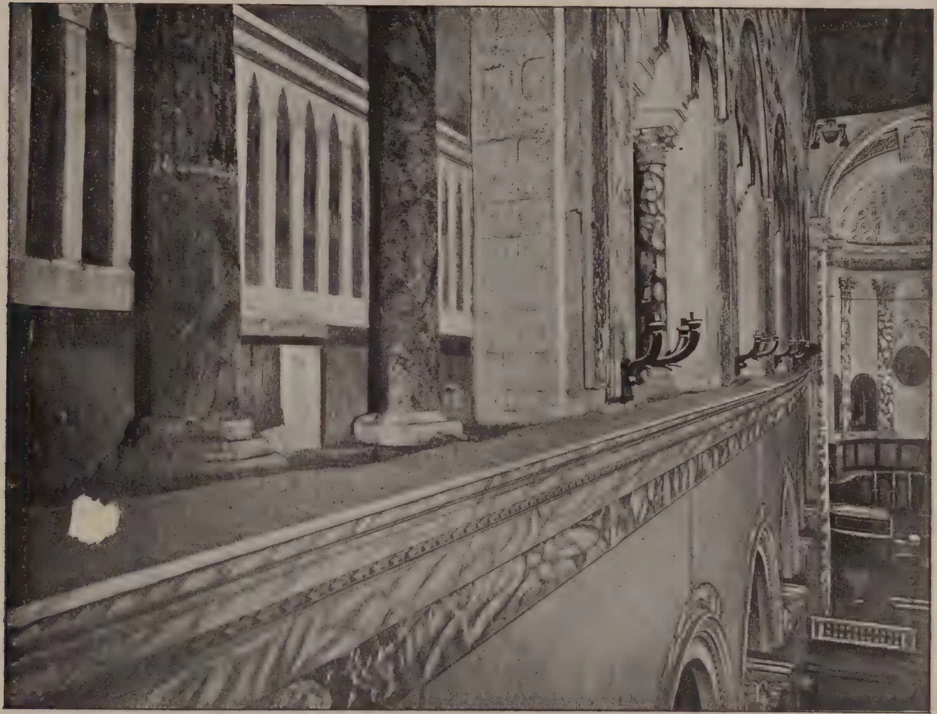
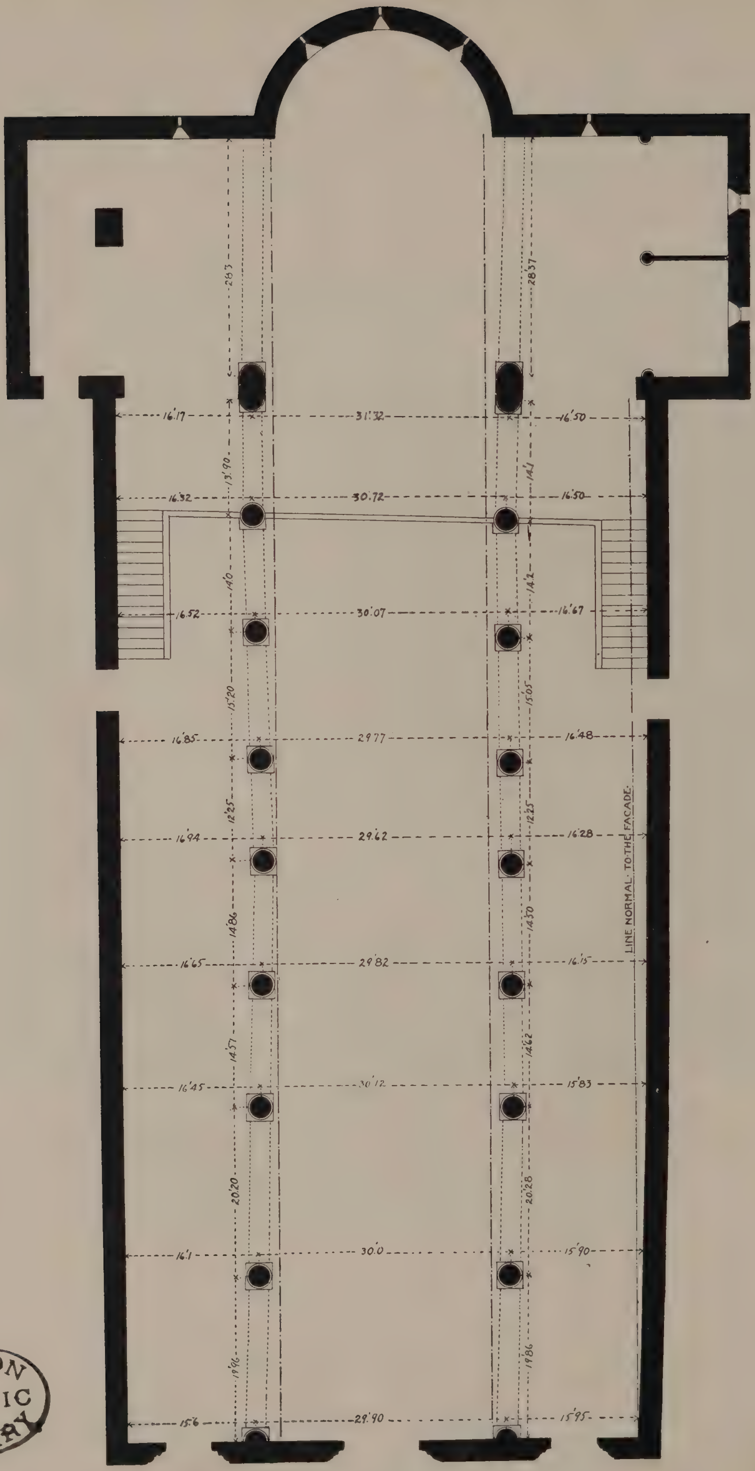


Fig. 3.—THE CURVE AT TRANI.

It extends upward from the supporting columns and their bases, showing thrust to be impossible. Republished from Vol. VI., No. 1. Fig. 5. Brooklyn Institute Survey.



BOSTON PUBLIC LIBRARY

Fig. 4.—PLAN OF THE FIESOLE CATHEDRAL.

Showing pier spacings which narrow toward the choir and parallel returning curves in th
ment of piers. These curves continue in the clerestory walls. Survey by Mr. John
McKecknie.

another case attested by a detailed survey into which no suspicion of either carelessness or thrust can be injected. No case has been so far quoted in which the objection of thrust could appear, for this is naturally eliminated when the curves are found in the plan of the foundations. Moreover, there are no vaultings at Fiesole. That both clerestory walls of a church, including the supporting piers could be built in *parallel* returning curves as a result of accident, is wholly incredible.

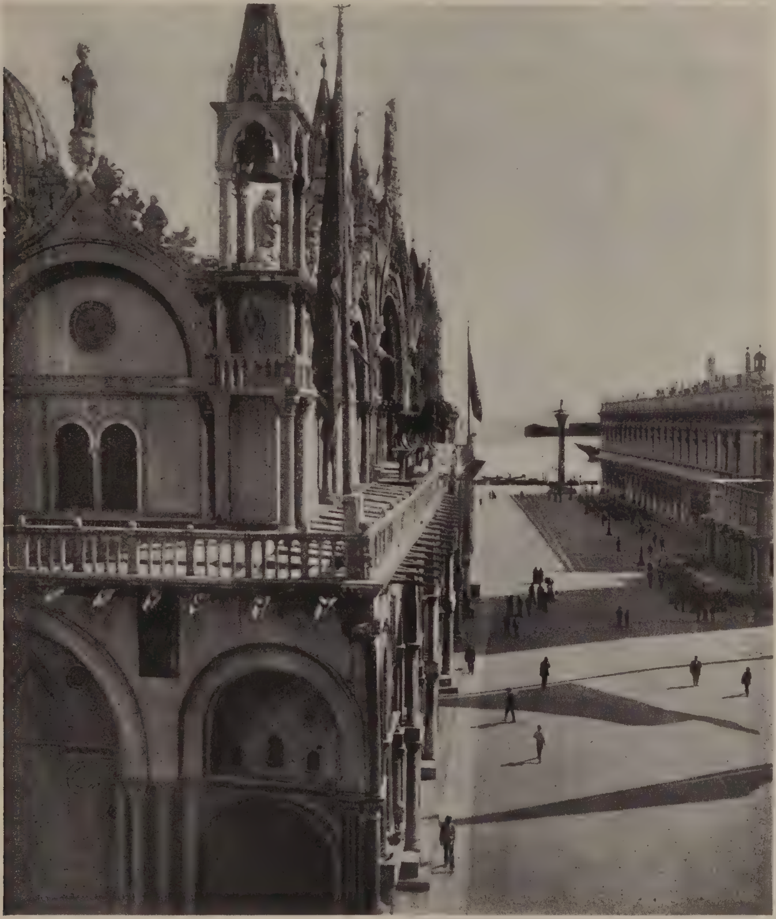


Fig. 5.—PHOTOGRAPH SIGHTING ON THE CURVE IN PLAN OF THE FACADE OF ST. MARK'S, VENICE.

The deflection at the pavement is ten inches, concave to the Piazza; i. e., counter to supposable thrust. The curve is repeated in the retreating upper story. Brooklyn Institute Survey.

St. Ouen at Rouen has a similar plan. In this case, if my memory does not fail me, both outer walls of the church follow the same line, which is not the case at Fiesole. Some remarks on an explanation current in Northern Europe and offered by the sacristan of St. Ouen, regarding the representation of the bending of the head of the Saviour on the cross, have been made in the preceding Paper, which related to the subject of deflected and oblique plans. As mentioned at the close of that article these deflected plans grade over into the curved plans, and among these are many which could not possibly represent the bending of Christ's head on the cross. A section of the Fiesole Cathedral, showing a remarkable case of perspective illusion in the arrangement of arches and pier spacings was published in a recent issue (Vol. VI., No. 2). These pier spacings are also represented in the survey of Fig. 4.

It would be possible to describe in detail a number of additional cases of curves in plan against which even the suspicion of thrust cannot be urged, but for the time being they will be briefly mentioned.

The façade of St. Mark's at Venice has a curve in plan of ten inches deflection starting at the foundations and concave to the Piazza. That is to say, in the upper surfaces, the curve is against the supposable thrust of the vaulting in the vestibule. See the photograph sighting on the curve (Fig. 5). This curve is best seen by noting first the corresponding line on the surface of the pavement. It is naturally much more easily seen in the dimensions of the building than in the small dimension of a photograph.

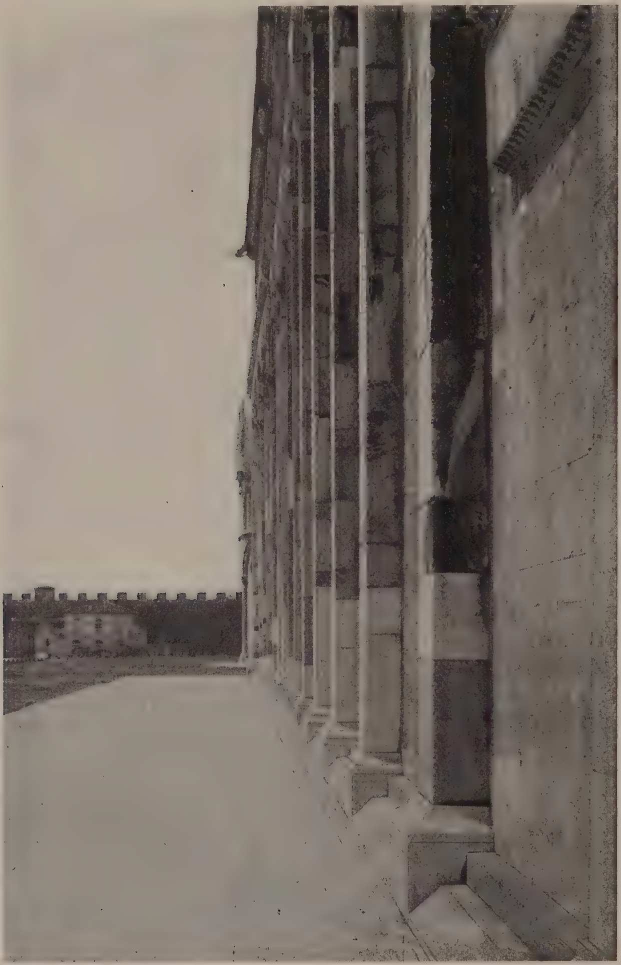


Fig. 6.—CURVE IN PLAN OF THE SOUTHWALL, PISA CATHEDRAL.

Deflection, 22 inches. Compare ground-plan in last issue (Fig. 5.) Brooklyn Institute Survey.

The north wall of S. Paolo Ripa

d'Arno at Pisa has a curve in plan convex to the street, starting at the foundations, and having about four inches deflection. Photographs of convex curves in plan are not generally satisfactory, and our photograph of this curve is not reproduced in this article.

The south wall of the Pisa Cathedral has a curve in plan, starting at the foundations, concave as regards the exterior and having a deflection of twenty-two inches. See Fig. 6. This curve holds, of course, in the upper wall and is there counter to thrust, of the aisle vaulting within. These above three instances do not acquire importance until they are considered as part of a system of building in bends and curves which holds in other parts of the given buildings. They then become important as cases which are wholly free from the suspicion of thrust.

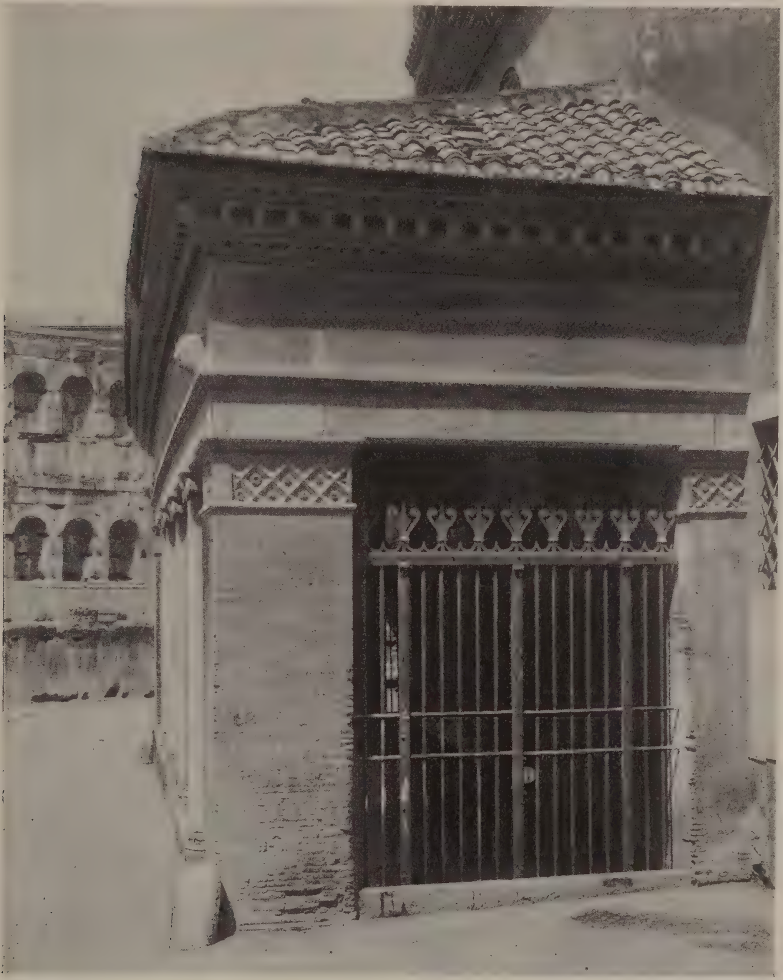


Fig. 7.—PORCH OF S. GIORGIO IN VELABRO, ROME.
The cornice curves in plan; no vaulting within.

The instances of exterior cornice curves in plan, which do not rise from the foundation, are always potentially open to the suspicion of thrust when they are convex to the exterior. It is well to remember here however that these cases are numerous in Italy for the period of Byzantine influence and that there are no known examples of exterior cornice curves for the Gothic. If masonry movement be assumed to explain these curves there does not appear to be any reason why they should disappear in the Gothic period.

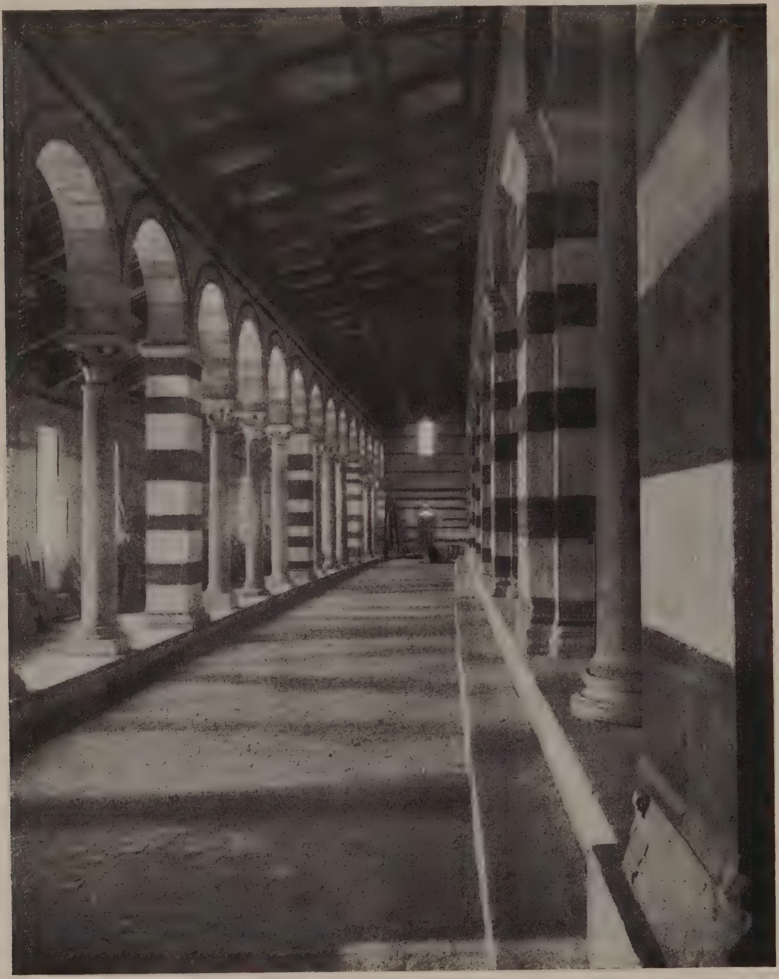


Fig. 8.—CURVE IN THE SOUTH GALLERY, PISA CATHEDRAL.

View looking toward the facade. The same curve appears in the gallery cornice, deflection about five inches. This curve is counter to thrust of the aisle vaulting. Brooklyn Institute Survey.

We offer an illustration of such an exterior cornice curve in plan from the porch of S. Georgio in Velabro at Rome (12th century porch; 7th century interior). There is no vaulting inside this porch and no thrust to be suggested from the timber truss-work within. The joints of the brick-work have not parted. (Fig. 7.)

It is so far apparent that no general theory of thrust or other accidental displacement, will make headway as explaining the phenomena, or receive even a moment's consideration from experts when the facts are known; we shall therefore begin to consider more in detail the possibility of carelessness or constitutional inability to construct straight lines of masonry. Mentions of individual or isolated curves like those just specified for the façade of St.

Mark's, the north wall of S. Paolo Ripa d'Arno, or the south wall of the Pisa Cathedral, do not carry much weight with a sceptic considering a report and not weighing the facts on the ground. In face of the monuments there is an aggregation of facts pointing to a system of optical refinements and such a multitude of instances of curves that the cases wholly free from suspicion of thrust are not easily to be explained as due to carelessness. For instance, the remarkable points published for S. Paolo Ripa d'Arno in the last issue, favor the belief that the masons knew what they were doing there, but in weighing a report the sceptic is disposed to suggest careless building for every isolated curve. Hence the value of the evidence offered by the churches in which the curves are found in pairs in the lines of the nave or clerestory. The number of instances of this class is sufficient to show that they belong to a system of building connected with the more distinctly bent and deflected plans discussed in our last Paper.

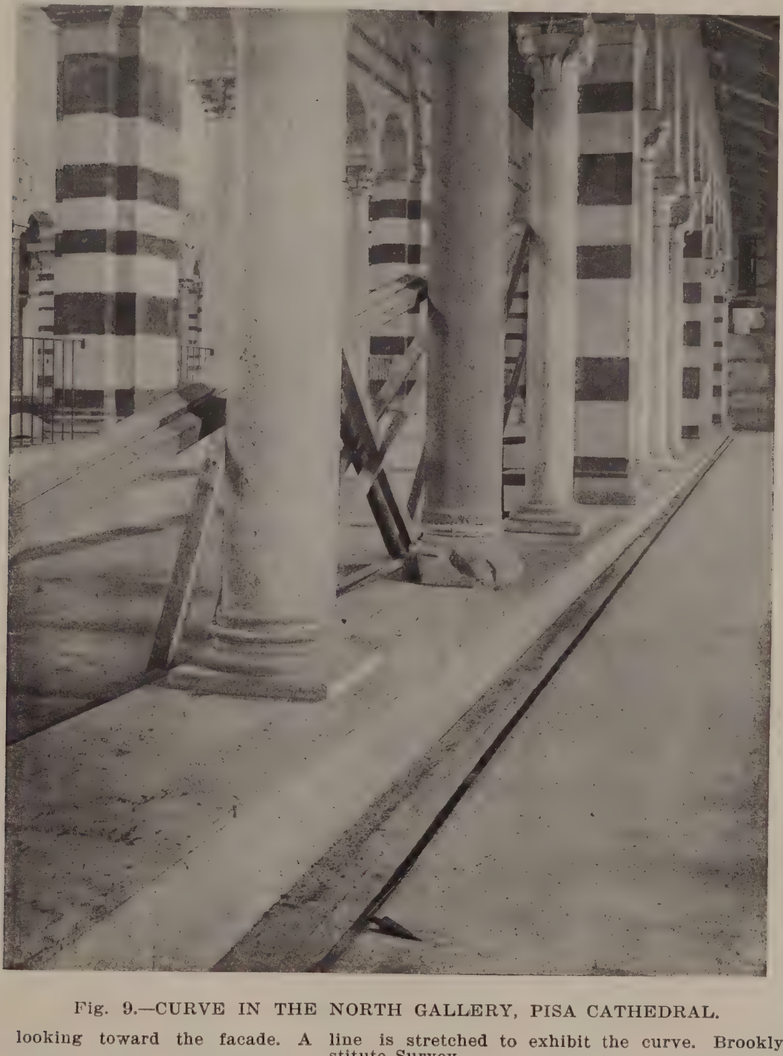


Fig. 9.—CURVE IN THE NORTH GALLERY, PISA CATHEDRAL.

View looking toward the facade. A line is stretched to exhibit the curve. Brooklyn Institute Survey.

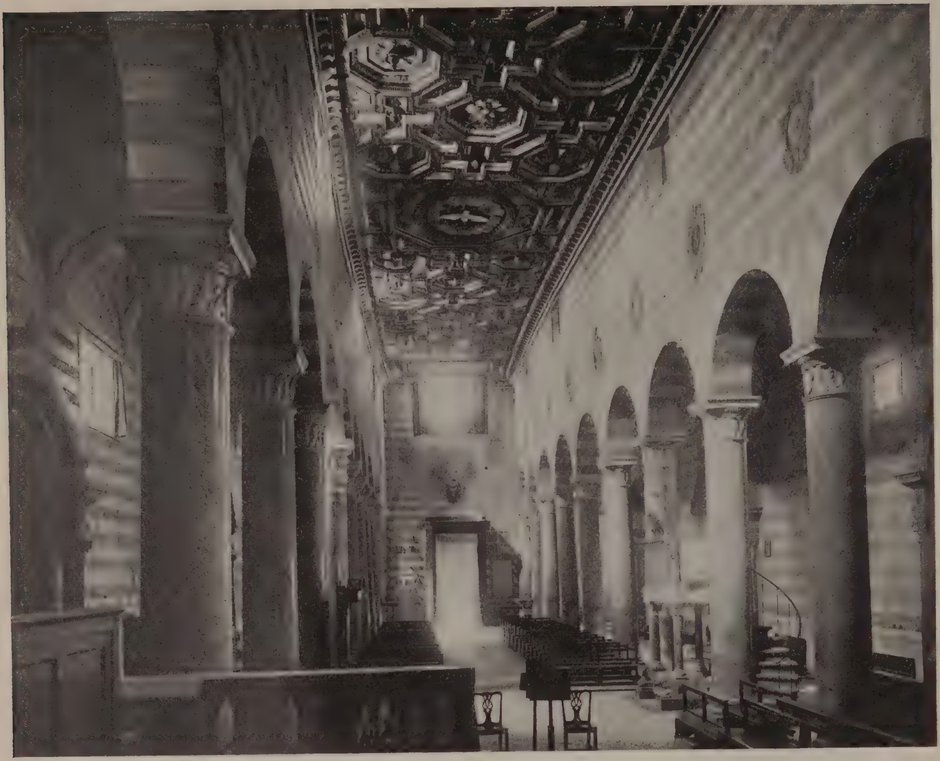


Fig. 10.—CATHEDRAL OF VOLTERRA.

View looking toward the entrance. Showing parallel curves in the clerestory walls. Brooklyn Institute Survey.

These would appear to be a medieval exaggeration or development from the more delicately bent or curved plans now being considered. From this point of view the quoted cases at Ravenna, Genoa, and Fiesole appear to be very satisfactory evidence. We will now add mention of similar instances at Toscanella, and in the Siena and Pisa Cathedrals. The bend of the façade of S. Pietro at Toscanella is represented by the survey of our last Paper (Fig. 1, Vol. VI., No. 3). No expert will suggest careless construction here.

In this last Paper (Fig. 18) was also published a survey of S. Maria at Toscanella, but reference was purposely then avoided to the curves. Attention is now again called to this survey and to the curve in plan of the line of columns on the left of the nave. The bend continues in the alignment of the choir. The columns on the right side of the nave are in line, but the corresponding bend appears in the alignment of the choir. See Fig. 13 for a photograph of the left clerestory wall.

In the Cathedrals of Siena and Pisa the upper lines of the nave are curved or bent in plan and in the same direction on both sides of the church, but the bends are not found in the alignment of the supporting columns or piers of the naves. The bend of the Siena choir (Fig. 12) is much more abrupt than the bends in the clerestory cornice lines of the nave. These clerestory cornice lines at Siena correspond in arrangement to the gallery lines at Pisa, and our illustration for both, as regards the general facts, will be drawn from the latter cathedral (Fig. 8). These curves have a deflection of about five inches.

In these two cathedrals the curve on

one side of the nave might potentially be due to thrust of the aisle vaulting, but as the curves are parallel as regards direction, it follows that the curve is counter to thrust on the opposite side of the nave. Thus at Pisa the south gallery line curves counter to thrust (Fig. 8). This curve was photographed for convenience on the inside of the gallery, but it also holds on the exterior side.

Fig. 9 is taken in the aisles of the north gallery. It will be noticed that this curve is above two lines of thrust in the aisle vaultings below, which are opposed to one another.

The clerestory walls of the Cathedral at Volterra show the same bends (Fig. 10) which are found at Pisa, Siena, Toscanella, Fiesole, Genoa and Ravenna. This cathedral was built by Nicola Pisano, which is a suggestive fact, considering that Pisa, on the whole, is the most remarkable centre for these phenomena taken collectively. The Cathedral of Prato, whose phenomena have been illustrated in preceding Papers was begun by Giovanni Pisano and Pisan artists are known to have been long employed on the Siena Cathedral. Their co-operation at Orveto has been asserted by some authorities.

The curves do not appear at Volterra in the alignment of the columns, and these lean on both sides of the church in the same direction. It is difficult in the case of this Cathedral to conceive of any movement in the walls or in the earth's surface which could have curved both clerestory walls throughout their whole extent, from top to bottom, in one direction. There has, however, been a movement of masonry due to accident or earthquake in one outer wall of the Volterra Cathedral, and this instance needs more circumstantial description than space allows at present. The value of our illustration for Volterra is that it offers a photograph showing facts similar to those found elsewhere about whose constructive existence there can be no suspicion. The leaning columns of the nave at Volterra suggest a difficulty to one who has not grasped the possibility that even the leaning columns of some Italian churches may possibly belong to the phenomena of constructive assymetery. It may also be that the church was originally built with curving walls and that it has subsequently suffered from a settlement on one side which drew over the opposite side. Both lines of nave columns at Volterra lean in one direction, but the nave is not vaulted, and although the present ceiling is of Renaissance period it is hard to see how any forces operating through the original timber ceiling could have bent two walls into parallel curves.

All cases of church interiors so far quoted offer bends or curves in plan which have the same direction on both sides of the church. S. Agnese at Rome and S. Mustiola at Chiusi, on the contrary, show upper curves which are both convex to the nave and which are not found in the alignment of the nave columns. Fig. 11 shows one of the curves in S. Agnese of a wonderfully delicate construction. It was impossible to place the camera so as to sight directly over it. The deflection is three inches in seventy feet. It seems impossible that curves of such delicate nature could be repeated with the same amount of deflection in both gallery cornices as a result of careless building. The suspicion of thrust from aisle vaultings is eliminated here by the heavy parallel curves in the outer walls of both galleries amounting to six and seven inches. If the curves of the gallery cornices were due to thrust of the aisle vaulting the curves of the gallery walls would be in the opposing direction. The survey has photographs sighting on these walls. I believe there are no aisle vaultings at Chiusi (S. Mustiola). The clerestory walls curve from top to bottom (both sides convex to the nave, as before observed).

In the Orvieto Cathedral the galleries are both curved concave to the nave (only to be sighted in the galler-

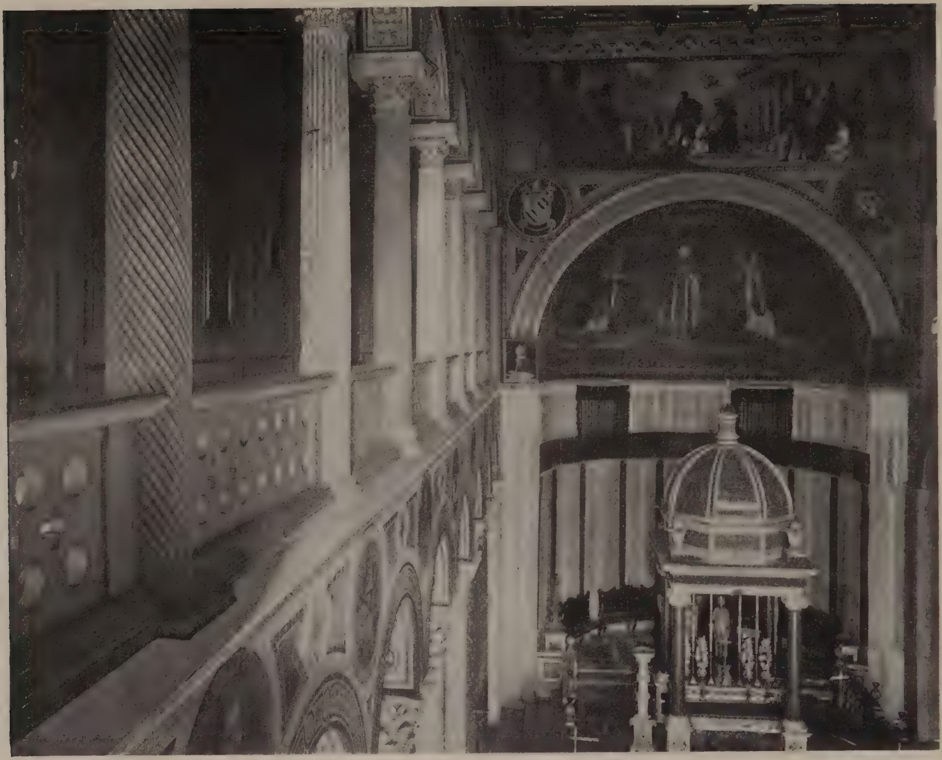


Fig. 11.—S. AGNESE, ROME (7th century).

Showing a curve in plan of the gallery cornice. The opposite gallery shows the same curve of 3 inches deflection in 70 feet. Brooklyn Institute Survey.

ies). This is the only case noticed in Italy of two curves concave to the nave. There are no aisle vaultings here, but if there were, the curves would both be counter to thrust. The survey possesses photographs of these curves. The masonry construction is in good condition and wholly without partings in the joints. Curves or bends in plan for clerestory walls are also mentioned in my note-books for Troja (a Byzantine colony) for Amalfi Cathedral (a Byzantine centre) and for the Cathedrals of Naples and Beneventum. These observations are not however sufficiently minute and specific to be of value in this Paper, excepting as possibly corroborative facts, attesting a widespread diffusion of the phenomena, and supporting the view that Byzantine Greek influence is the original source of the medieval curves.

We will now consider some general arguments against the possible view that careless or rough building may explain the phenomena mentioned, as nearly all the instances quoted negative without debate, thrust or accidental masonry movements.

(a) The phenomena of curves or bends in plan are not characteristic of the churches which are distinguished by rough building in other details. All the most important cases known to our survey have been specified (except the cloister curves) and it will be admitted that the cases are all in the more important churches of the given locality. The phenomena have not been noticed, for instance, in the minor churches of Siena, or Orvieto or Volterra. They appear in St. Mark's but have not been observed at Torcello or Murano. They are seen at Pisa in S. Paolo Ripa d'Arno (the old Pisa Cathedral) and in the Pisa Cathedral but not in the neighboring humbler basilicas of S. Piero in Grado or Calci or in the minor Pisan churches. They are not known to the multitude of poorly built minor early Christian basilicas at Rome.

(b) The above point is repeated here in other words. There is too much rectilinear building in Medieval Italy in poorly built churches to favor the suggestion that building to a straight line was either difficult, unusual or unpracticed. It may be added that rectilinear building occurs so constantly in some portions of churches showing bends or curves that the theory of carelessness seems also improbable on this account.

(c) The point as to Byzantine centres has been dwelt upon. No church is known for instance in Florence, in Perugia, in Prato, or in Pistoja which exhibits horizontal curves. Of all refinements dwelt upon by these articles that of the horizontal curves is the rarest and the most definitely related to the known facts of Byzantine Greek influence, or of classic survivals in other particulars. It is impossible to understand why horizontal curves should not be frequent in Gothic

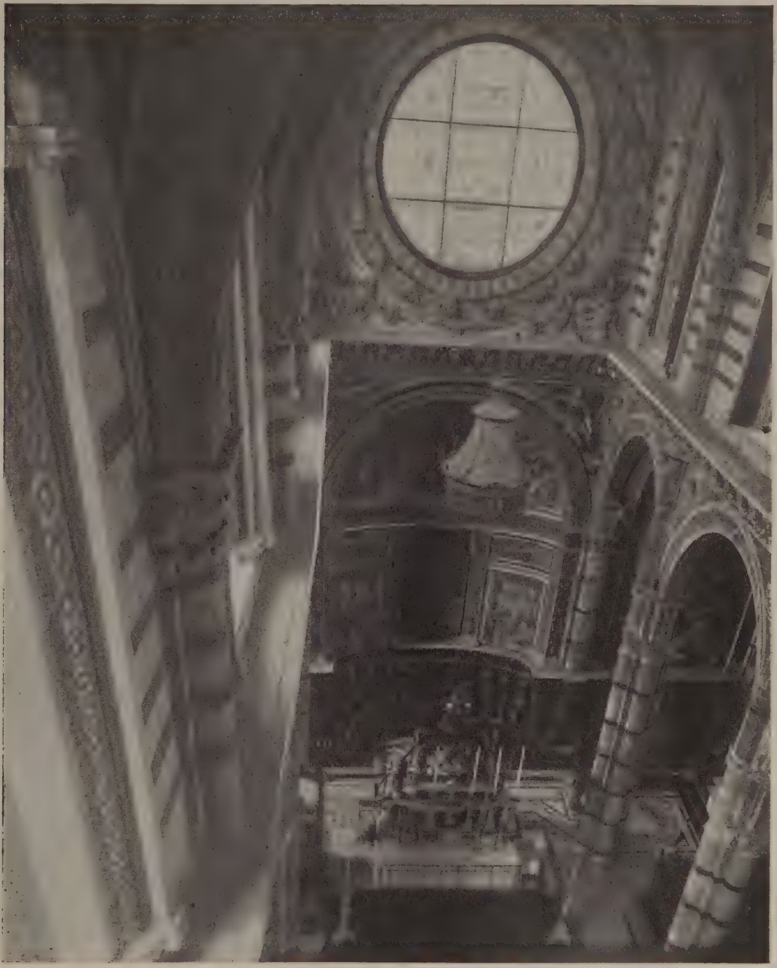


Fig. 12.—BEND IN PLAN OF THE CHOIR. SIENA CATHEDRAL.

Taken from the dome gallery. Brooklyn Institute Survey.

churches, in roughly built churches, and in centres or periods remote from Byzantine influence, provided they are to be explained by accidental causes or medieval carelessness.

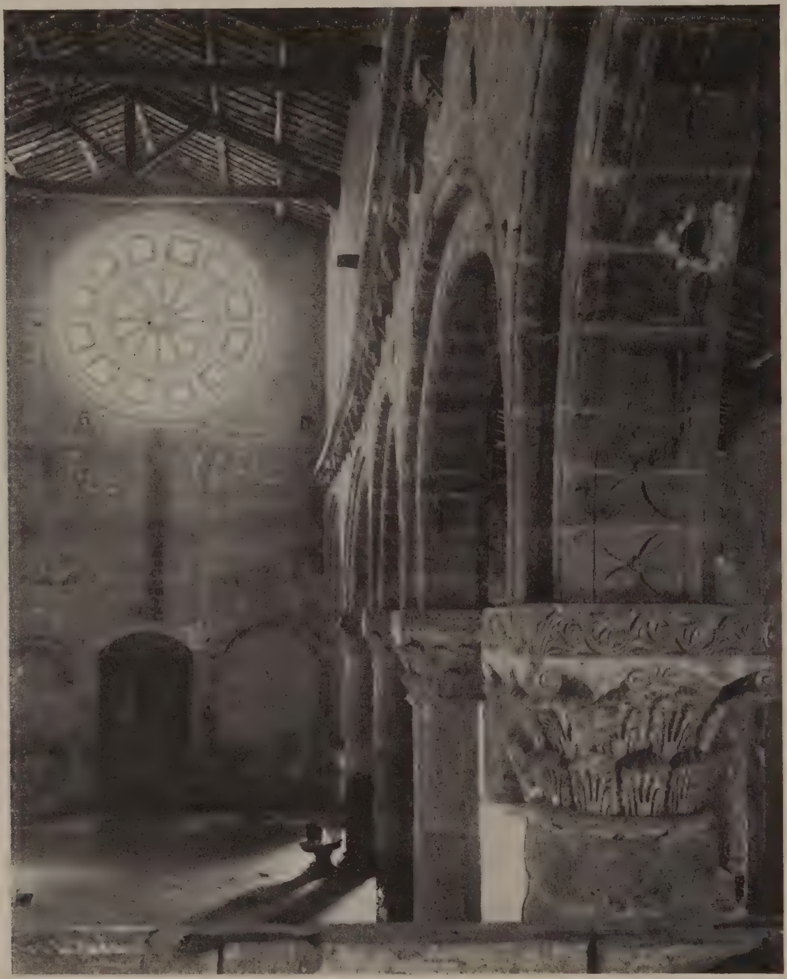


Fig. 13.—S. MARIA, TOSCANELLA.

View looking toward the entrance and taken from the pulpit. The curve of the wall begins in the bases of the supporting columns (12 inches deflection). Compare survey for plan Fig. 18, Vol. VI., No. 3.

(d) In no one of the cases quoted do we find a "wobble" or a line bending back and forth. If the bends are due to rough building why is the one uniform direction preserved? A returning curve of the large sweep seen at Fiesole does not interfere with this argument. At Fiesole the curve is uniform for the whole nave and is reversed as regards direction in the choir (Fig. 4).

(e) Many of the curves are too delicately regular to admit of the theory of careless building—see for instance the curves of S. Agnese (Fig. 11), of Genoa (Fig. 2), of Trani (Fig. 3).

(f) Some of the bends are so abrupt and so accurately jointed withal that the theory of careless construction is again inadmissible. This applies to the bend in plan of the choir at Siena. (See Fig.

12.) There are many cases in which the accurate and close fitting of joints, which is involved in the purposed construction of such bends, can be studied, as for instance in Fig. 12.

(g) If it be urged that such bends ought not to be included in an account of curves which are supposed to be derived from classic tradition, the answer is obvious that medieval tradition and practice would have tended to produce ruder and more imperfect repetitions of the Byzantine Greek originals, and that if the standpoint of purposed asymmetry be admitted to have been a general one, the bend will illustrate this feeling as well as the curve. If the curves at Orvieto or at Toscanella (see Fig. 13) were the only ones, they might be attributed to rough construction, but when the facts are viewed as a whole they show in the given cases exactly what provincial or medieval builders would naturally have done with an originally Greek refinement.

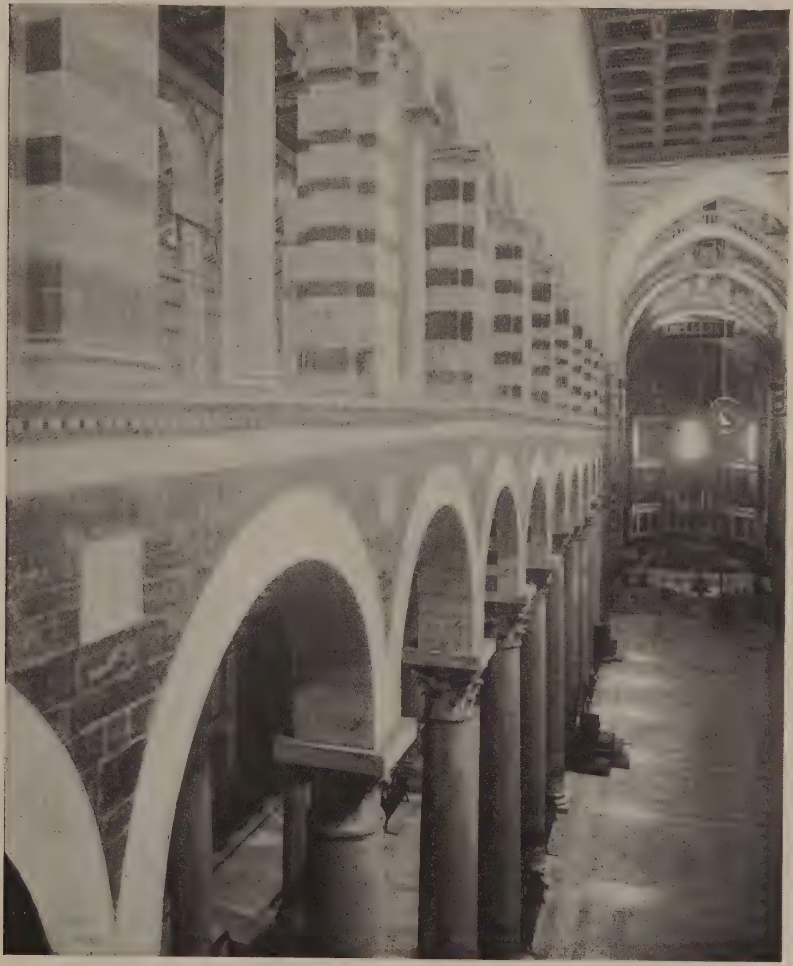


Fig. 14.—BEND IN ELEVATION, NORTH GALLERY, PISA CATHEDRAL.

Brooklyn Institute Survey. Compare the section Fig. 6, Vol. VI., No. 3.

III.

Our demonstration has not yet exhausted its points, for so far the curves and bends in elevation have not been considered.

The expert is requested to consult the surveys for the gallery levels at Pisa, which were published in the last issue, showing the bends in elevation of these galleries (Figs. 6, 7, Vol. VI., No. 3), and then to compare the photographs herewith (Figs. 14, 15). That these bends are in the masonry construction is of course undisputed. It is as little open to dispute that no theory of accidental irregularity or careless building will account for them as occurring at exactly the same points and over the same corresponding column in both galleries. The bend of the north gallery (Fig. 14) shows a rise from the façade gallery to the third column of .78 and a fall from that point to the transept of .93 (decimals of a foot). The bend of the south gallery (Fig. 15) shows a rise from the façade to the third column of .83 and a fall from that point to the transept of .83. If it be suggested that the bend in Fig. 14 is so obvious as to defeat its own purpose and that it is too pronounced to be regarded as a "refinement," it may be answered that it

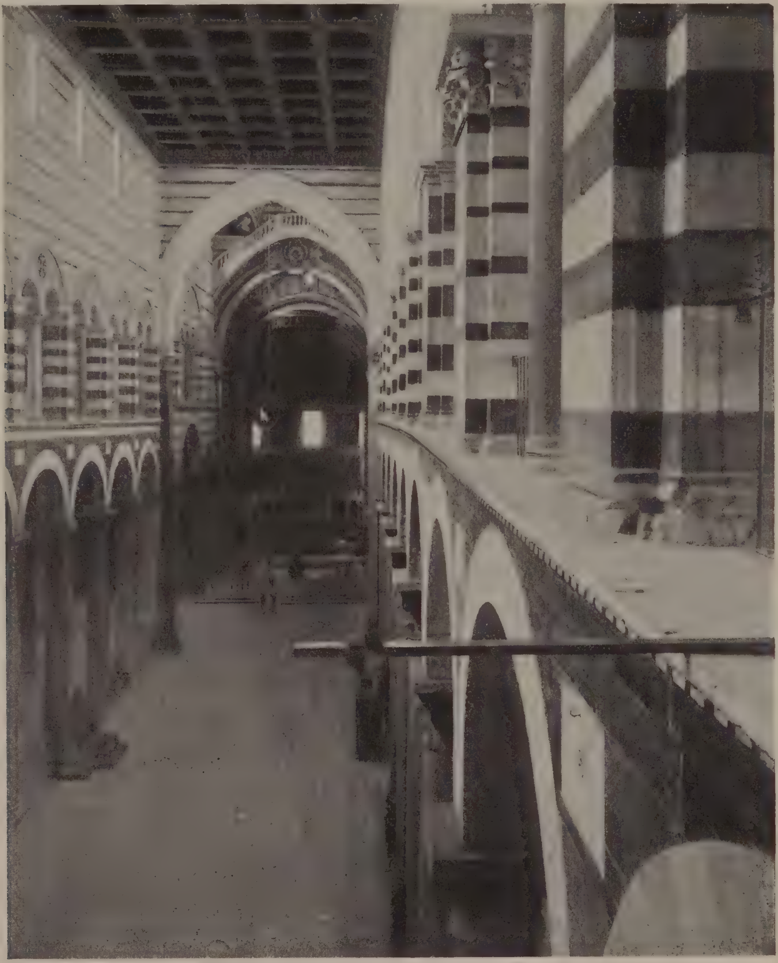


Fig. 15.—BEND IN ELEVATION, SOUTH GALLERY, PISA CATHEDRAL.

Brooklyn Institute Survey. Compare the section Fig. 7, Vol. VI., No. 3.

wholly escapes detection from the floor of the nave, as hundreds and thousands of visitors at Pisa can testify. Not only is its effect discounted by the eye into perspective in the nave, but from most points of view this bend also escapes detection in the galleries and is only noticed by sighting. The results for the eye are not represented by such photographs as Fig. 14. The photograph is seized by one glance of the eye, but in the dimensions of the building the eye must move in order to see the whole line, and its deflection then corresponds to the ordinary facts of vision, with some exaggeration of apparent dimension. We have illustrated and described in this Paper the curves in plan of these same gallery cornices (Fig. 8). If now it be admitted that the bends in elevation are constructed and that they cannot be due either to accident or to carelessness is it not likely that the bends in plan of the same cornices were also intentional, and if this be ad-

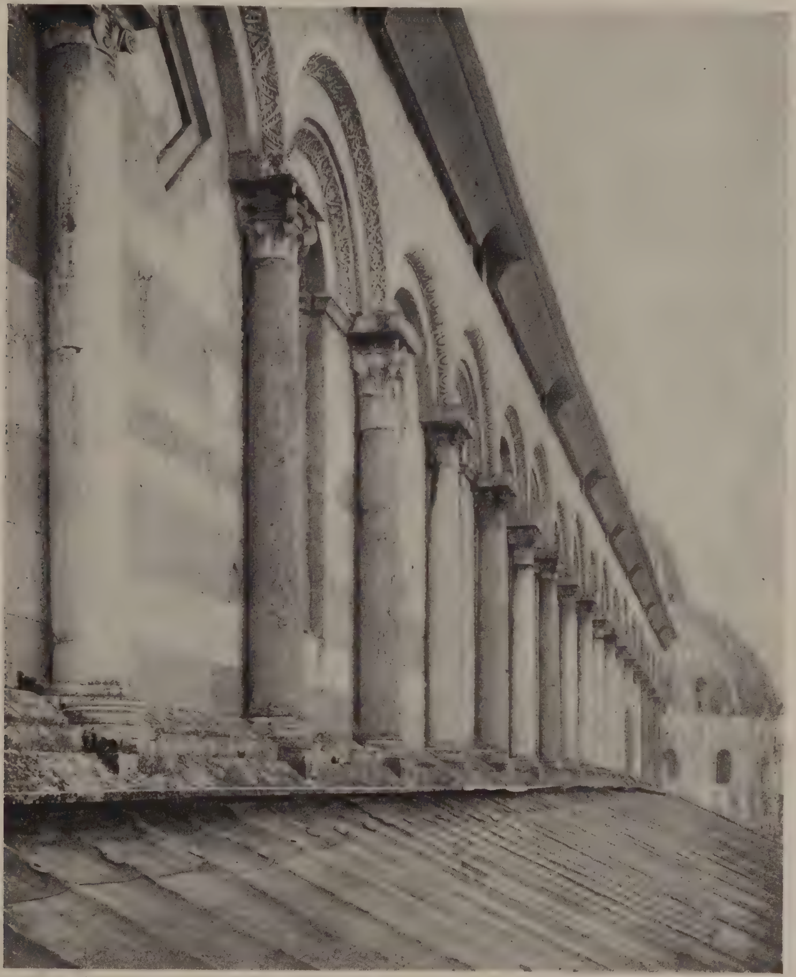


Fig. 16.—CURVE IN ELEVATION, NORTH CLERESTORY WALL, PISA CATHEDRAL.

View looking toward the facade. There is a corresponding curve on the opposite side which has also been photographed. These curves are directly above the interior gallery bends. Brooklyn Institute Survey.

mitted does not the probability grow that the curve in plan of the south wall had also a constructive purpose? The curves in elevation of the upper exterior walls of the Pisa Cathedral would then appear also to be due to constructive purpose (Fig. 16). These curves are directly above the corresponding bends in the galleries. The survey has a photograph for a corresponding curve on the opposite side of the Cathedral.

Bends which are similar to those of Figs. 14, 15, occur in the clerestory cornices of the Cremona Cathedral. (The remarkable plan of this cathedral appeared in the last issue and the illusive arrangement of arches and pier spacings was described in Vol. VI., No. 2.) The given bends at Cremona are wholly imperceptible from the pavement, where they are discounted into perspective effect. They can only be detected by ascending to the space beneath the aisle roofs, and above the vaultings of the side aisles (there are no galleries at Cremona). The rise of the cornice appeared to be about three inches and the drop about a foot. Bends which occur at corresponding opposite points cannot be due to carelessness.

The gallery bends at Pisa have their counterparts in the stripings of the outer walls of the cathedral. (See Fig. 11, Vol. VI., No. 1.) These exterior bends occur at the fifth bay from the façade on both opposite sides of the church. They cannot therefore be due to carelessness. Our next Paper will show that they cannot be due to settlement, as was supposed by Mr. Ruskin. Our survey has photographs and observations for many delicate curves in the Pisa Cathedral (as distinct from bends) which are not entered in this Paper.

One more remarkable case may be noted here. It is that of the plinth blocks which support the aisle columns on the north side of the Cathedral. The measures for the heights of these plinths are entered in the survey for the gallery levels (Fig. 6 of the last issue). They are repeated below in order from the entrance to the transept (feet and decimals).

1.35: 1.57: 1.73: 2.17: 2.47: 2.30: 2.05: 1.84: 1.30: 0.57.

These figures rise gradually to the centre and drop gradually beyond it without a break in the scheme. According to the law of permutations and combinations, otherwise the law of chances, the chances are about three million to one against accident in the arrangement of this series.

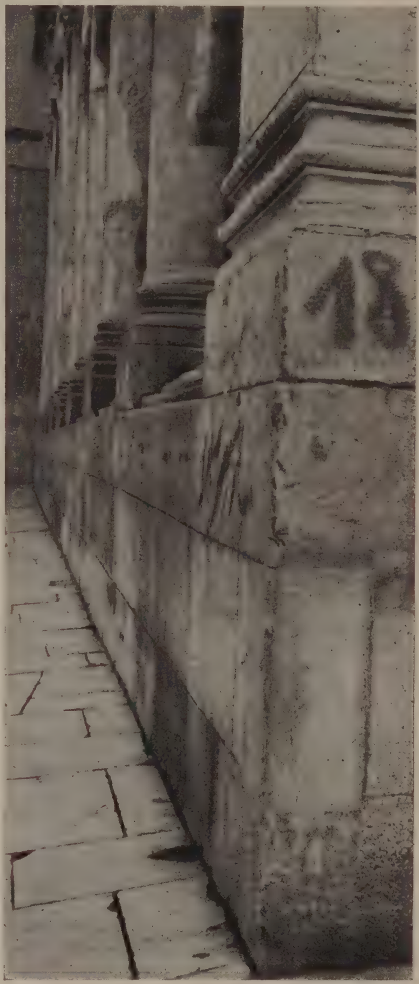


Fig. 17.—Curve in elevation, S. Michele, Lucca.

The curve has about 5 inches deflection in 76 feet. There is a similar curve in the cornice above. These curves are repeated on the opposite sides of the church, where they are slightly less than three inches. Brooklyn Institute Survey.

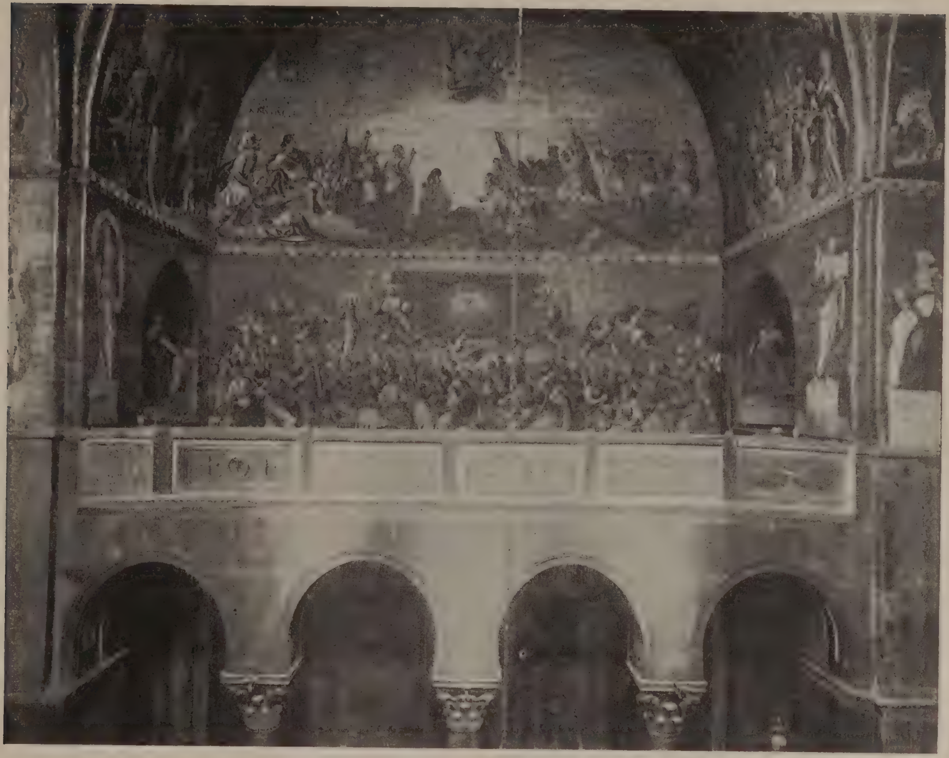


Fig. 18.—BEND IN ELEVATION, GALLERY OF ST. MARK'S, VENICE.

Brooklyn Institute Survey.

We also photographed very delicate curves in elevation on the exterior of S. Michele at Lucca (Fig. 17). On both sides of this church the curves are found in the base courses (see photo.), and also in the cornices. On the side photographed the base courses curve about five inches, with slight increase in the cornice. On the opposite side the curve is slightly under three inches, both above and below. The length of these walls is about seventy-six feet. The survey possesses accurate photographs for all these curves. The survey has also photographs and measures for masonry bends below and cornice bends above, in S. Alessandro at Lucca. These are also bends in elevation. The survey has also photographed curves in elevation of a more roughly built character on the side of the cathedral of Ferrara, and they appear in all the interior galleries of St. Mark's at Venice (Fig. 18). There are twelve other galleries in St. Mark's having similar curves in elevation and the survey has photographs for six of them. In St. Mark's the question of settlement had to be carefully considered, and all possible means were taken to reach certainty on this head as regards the origin of the given curves. It is believed that experts who examine the galleries of St. Mark's in connection with the evidence from Pisa and other sites will agree with the opinion that these curves are not due to settlement—but it might be well for such experts first to consult Mr. Street's observation as to the more prominent bends in St. Mark's pavement and to imitate his example of testing the facts regarding the pavement by a visit to the crypt.

The following passage will be found in Street's: "Brick and Marble in the Middle Ages," relating to St. Mark's, and my readers will remember that the observation is that of a practical architect and of an expert in construction. "But of all the features of this grand church that which next to the gorgeous colors of the walls most attracted me was the wild beauty of the pavement. I know not what other word to use which quite describes the effect it produces. It is throughout arranged in the patterns common in most Opus Alexandrinum, but instead of being laid level and even, it swells up and down as though its surface were the petrified wave of the sea, on which those who embark in the ship of the church may kneel in prayer with safety, the undulating surface serving only to remind them of the stormy sea of life, and of the sea actually washing the walls of the streets and houses throughout the city. It cannot be supposed that this indulation is accidental, for if it had been the consequence of a settlement of the ground we should see some marks of it in the crypt and walls and some tokens of disruption in the pavement itself. And the corresponding example of Sta. Sophia at Constantinople where we have it on record that there was an intentional symbolism in just such a floor is conclusive as to the intention of its imitators here." Our own examination of the pavement of St. Mark's shows many minor depressions which must be due to settlement, but the ceiling of the crypt argues that the main and prominent wave line (across the church) of the pavement is intentionally constructed. At all events the piers have not settled and it is only here that the curves of the galleries could have been accidentally produced. One point is clear for the curves in elevation of the galleries of St. Mark's. No movement in the way of settlement has taken place since the casing was put on, for its joints are close and well-fitted and the casing follows the lines of these curves (Fig. 18). The casing in question dates from the original construction of the church.

It is an important point that the curves and bends in elevation observed by our survey all exhibit the rising line—that is, they are always convex to the skyline or to the ceiling of the building and always concave to the spectator below.

The only case noted in Italy of a curve in elevation concave to the skyline is that of the centre string-course on the north wall of the Pisa Cathedral (see next issue). If the curves in elevation were not intentionally constructed it is difficult to understand why they are all rising curves. If, for instance, the gallery cornices of St. Mark's were due to careless construction, one would imagine that some would be concave and others convex and that some would be "wobbles." As a matter of fact there *is* one "wobble" in the whole large list of St. Mark's gallery curves, but none are concave to the sky-line.

It has been remarked in the opening of this Paper that when the proof of the existence of curves in Italo-Byzantine building is admitted the inference as to a connection of these phenomena with those of antiquity will be unavoidable. The question will now therefore be considered as to what present evidence there is of such connection.

It is an astounding fact that several of the Italian medieval cloisters exhibit curves in plan which are the exact counterpart of those discovered by Mr. Pennethorne at Medinet Habou.* These Italian curves are also convex to the court on all four sides of the court, and they are as regular and as delicate as any ancient curves. An impregnable case, as regards constructive purpose, is offered by the cloister of the Celestines at Bologna. In this two-storied cloister (Fig. 19 and Fig. 20) the walls curve regularly in plan (on all sides and in lines all convex to the court) from the foundations up, which eliminates the suspicion of thrust from the vaultings. On one side of this court, moreover, there are no vaultings on either story. These curves have a deflection on the second story of about 5 inches in 51 feet and are somewhat less prominent at the foundations. For these delicate curves, which are all convex to one point, there are only two theories possible, constructive purpose or thrust, and where thrust is impossible constructive purpose must be admitted. Experts who wish to test the facts described in this Paper are advised not to take adverse ground before they have examined this cloister of the Celestines. As the upper story is accessible, the curves can be literally studied under one's feet and in the jointing of the blocks of the parapet.

---

* See "Architectural Record," Vol. IV., No. 4.

The cloister of the Certosa at Pavia exhibits similar curves in all its parapets and in the alignment of columns, but not in the cornices, as far as my observation went. Similar curves in the alignment of the columns were noticed by Mr. Nelson Goodyear on all sides of the cloister of S. Zenone at Verona which I did not visit.

The cloister of Sassovivo near Foligno offers a beautiful example of curves in the cornices but not in the parapets (Fig. 21). The deflection is 2½ inches in 50 feet. They are found on all four sides of the court of the same delicacy. The joints of the masonry have not parted. Our photograph sighting on one of these cornice curves is fairly successful in showing the facts. They also appear in the cloisters of S. Paolo Furori le Mura and of the Lateran at Rome. Both of these latter instances are possibly open to sceptical objection, but when the case of the Celestine cloister at Bologna has been examined such objections will probably not be urged. The details of the masonry jointing in St. Paul's cloister offer many arguments in favor of the view that the cornice curves were built in by gradually leaning out the pilasters toward the centre of each side. This appearance would of course also hold, if the vault-

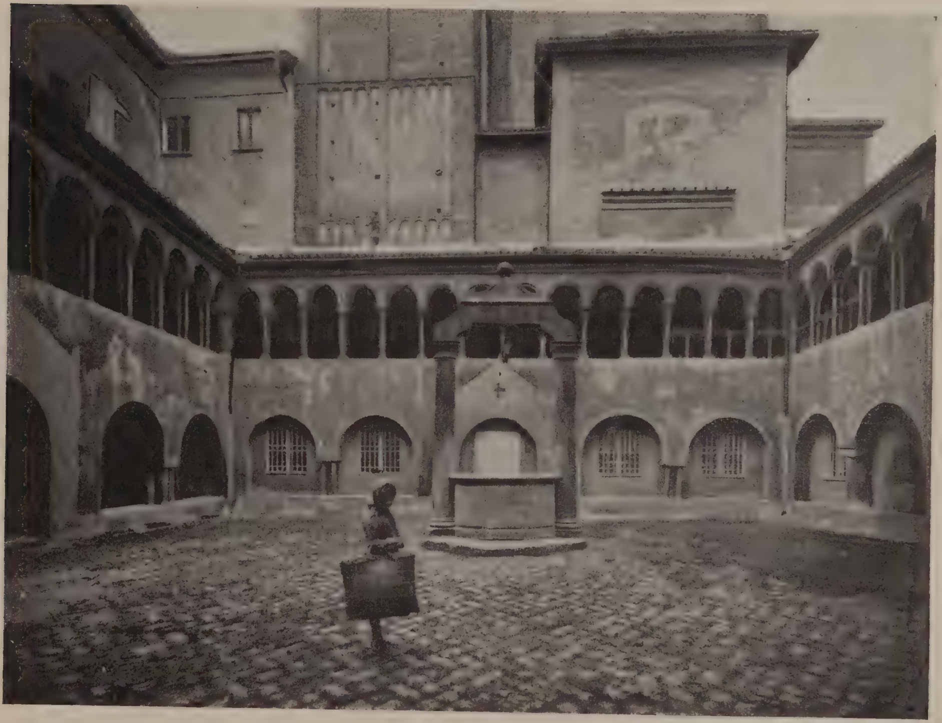


Fig. 19.—CLOISTER OF THE CELESTINES, BOLOGNA. (11TH CENTURY.)

ing had pushed out the cornice, but the tops of the pilaster capitals do not tilt downward as they would do, in the latter case. There are other indications of a constructed bend of the cornice in the cutting and fitting of the masonry blocks. The survey has a series of photographs to show these facts. In the case of the Lateran cloister the curves appear also in the parapets, which is decisive for questions of purpose in construction, but a thrust of the vaulting has possibly accented and exaggerated the curves seen here in the cornices. At all events, there are slight partings of the masonry joints which might have been caused in this way, on the east side of the court. The Lateran curves measure about 4½ inches in 87 feet at the cornice, and from 1½ to 2½ inches at the parapets; all convex to the court.

Let us now rehearse the points as to cloister curves. No case has been found in which the curves are not seen on all four sides of the court. There is no case known in which the curves are not delicate and regular and of the same character on all four sides of the court. For these facts there are three witnesses in the case of the two cloisters named at Rome and two witnesses for the cloisters at Sassovivo and Bologna. If accidental causes be assumed, would it not be surprising that a movement of mason-

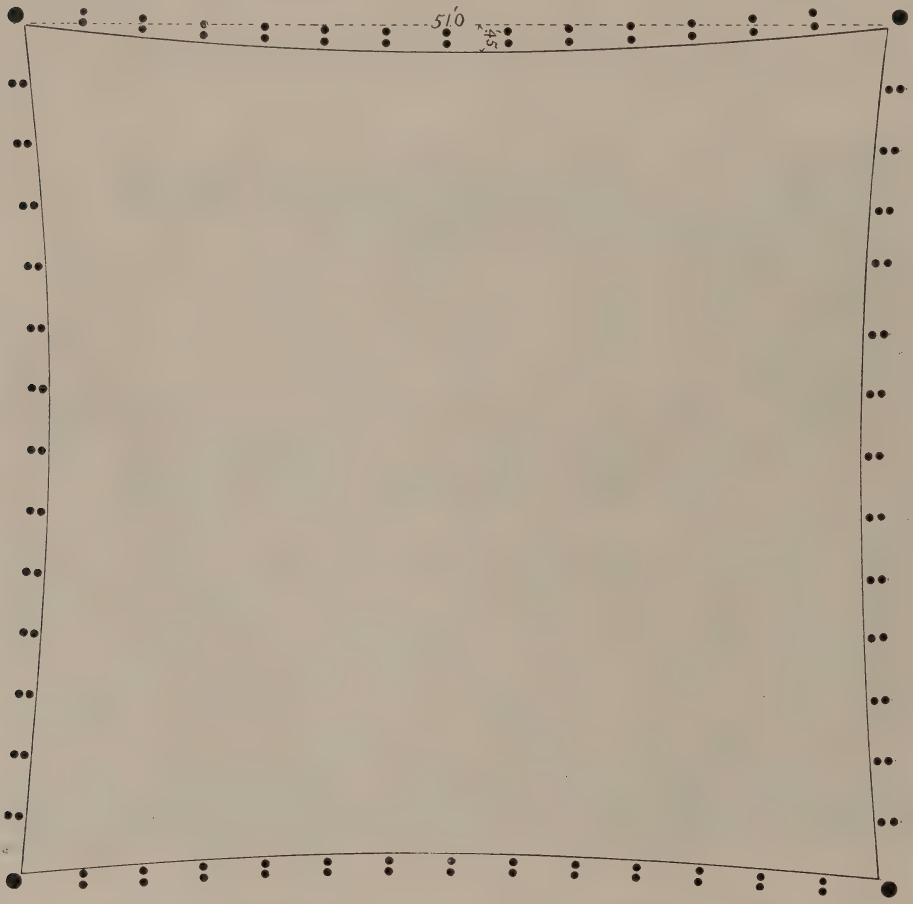


Fig. 20.—PLAN OF THE CLOISTER OF THE CELESTINS, BOLOGNA.

Showing the curves in plan at the level of the second story. The drawing exaggerates the curve.

ry had stopped short in so many cases at the same inconspicuous point and that it had produced in so many instances curves of the same delicate quality? Thrust is a force tending to disruption. Outside of the mind of the sceptic there is no reason why it should always stop short at the point required to produce a Greek curve. Admitting that steps had been taken to secure these vaultings from farther disintegration, how does it happen that these steps have always been taken before the masonry has parted perceptibly and before a bulge, as distinct from a delicate curve, has resulted? These arguments apply to S. Paolo Fuori, to the Lateran and to Sassovivo. They are not needed at Bologna. Our case here is impregnable. If now we undertake to summarize the results of this Paper from the standpoint of the sceptic, it will be found that, generally speaking, he will be obliged to assume thrust for the cloister curves and carelessness for the rest of the curves. He cannot, for instance, assume carelessness for the cloister curves, because they are always delicate and always in one given direction. He cannot assume thrust for the nave and clerestory curves, because so many are counter to thrust. He cannot assume thrust for the curves in elevation, because thrust does not operate here nor could any theory of settlement cover the facts which are known, for the curves and bends in elevation. Even if such a theory applied to St. Mark's it would not cover the facts known at Lucca and at Pisa.

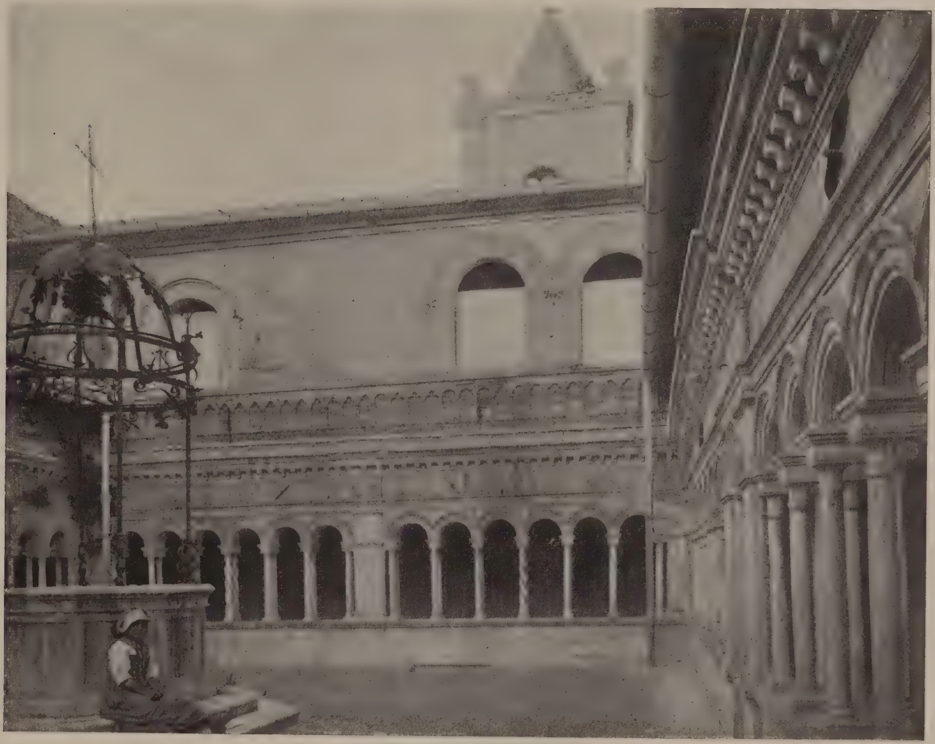


Fig. 21.—CLOISTER OF SASSOVIVO, NEAR FOLIGNO.

Showing a curve in plan of the cornice, with a deflection of 2½ inches in 50 feet. The same curve is found on all sides of the court. Brooklyn Institute Survey.

Having thus shown the sceptic what is the best ground for him to take generally, we will still farther assist him by pointing out the instances which he needs to deal with most carefully. Having generally assumed carelessness for nave and clerestory curves and for curves and bends in elevation, he should study the gallery levels of the Pisa Cathedrals (Figs. 6, 7, Vol. VI., No. 3, and photographs of this issue, Figs. 14, 15) and the ground plan of the Fiesole Cathedral (Fig. 4). Having generally assumed thrust for the cloister curves, he should pay a visit to Bologna.*

The point still remains to be considered whether the phenomena of Medieval curves tend to illuminate the purpose of those used in Antiquity. Everything goes to show that the Italian curves represent a dislike for mathematical symmetry and for the hardness and dryness of straight lines, and if they are classic survival or inheritance this must consequently have been one purpose of those used in Antiquity. There are cases of bends in elevation like those of the Cremona Cathedral clerestory cornices and like those of the Pisa Cathedral galleries which are locally connected with the obviously illusive arrangement found in the nave arches of these two cathedrals. It is therefore probable that the use of curves and bends in elevation was occasionally connected with a purpose of increasing effects of dimension. All curves in plan convex to the position of the spectator give the result of curves in elevation for optical purposes,* but the number of instances in which two parallel curves in plan were used in the church naves would show that optical mystification and an effect of "life" were the results generally sought.

---

*The cloister of the Celestines belongs to the complex of churches indexed in Baedeker under the name of the church of S. Stefano.

*See "Architectural Record," Vol. IV., No. 4, "Origin of Greek Horizontal Curves."

Wm. H. Goodyear.

(*To be Continued.*)

DECORATIVE WINDOWS IN ENGLAND AND AMERICA.*

THIS book is peculiar in having a very elaborate analysis of its matter presented in the form of a table of contents. Pages 7 to 15 are occupied with this analysis, each chapter having its general title followed up by a close and well-reasoned statement of the course of thought of the chapter itself. Thus, the chapter on Light and Shade is analyzed through more than a page of close printing, as follows: "Light and Shade may enhance the interest of details, or the decorative beauty of the whole; these two considerations must always go together, p. 75; light and shade as means of expressing modelling; possibilities of light and shade unlimited in glass; but limits to their use very important; extreme degrees of light and shade seldom sought by painters, 76; plausible contention that capacity for depth without blackness should be utilized for effects of chiaroscuro; objection that this would lead to false expectation and put spectator on wrong track, 77," and so on, down to page 101. A careful reading of this synopsis of the book reveals a remarkable intelligence and rightness of theory and a consistent and thorough development of the thought from the beginning to the end of the work. Nowhere is there to be found a sounder theory of fine art as developed in the matter of decorative painting, especially in that translucent decorative painting which we call stained glass; nowhere is the series of truths, which every worthy artist admits in his practice, whether he has thought them out or not, more perfectly expressed in brief words of analysis than is found to be the case here. In fact, if the book were lost and these leaves of the table of contents alone were left, they would afford an admirable scaffolding by which to erect a structure similar to the book before us in purpose and in aim. Any student of the art might find a theory of his proposed book ready made to his hand, and might, with confidence, proceed to develop the severely abstract statement of principles here given into a treatise. It is, of course, in the development of these thoughts into a treatise that different writers will differ greatly.

The decorative windows of the Middle Ages were made by putting together, with leaden sash bars, irregularly shaped pieces of glass of different colors, upon which glass, painting in opaque, vitrifiable pigment was freely used. This opaque pigment naturally joined with the leads in forming a dark background, which was so formed as to its outline that the translucent color was left to express the figures, the drapery, the different objects which the design of the glass included. A piece of blue glass would, for instance, form the sleeve of a garment, and this piece of glass was shaped nearly as required for the sleeve, but the exact outlining of the sleeve was produced by painting in upon the blue glass from the lead which surrounded it on either side. That is to say, the narrow strip of lead was widened on the side toward the blue sleeve by painting with this opaque, brownish-black color directly upon the piece of blue glass. Moreover, the folds which were required to model the sleeve and to give it some semblance of roundness, and also to express its tumbled and creased character, were rendered by the same painting in opaque color carried into the blue from the solid background. The same treatment marked the painting of the face, or the naked hand, or arm, with this difference, that as the gradations required on the flesh are more delicate than those which a piece of drapery makes necessary, the process of painting with the opaque pigment is less uniform. In the sleeve which we have taken as an instance of a garment or a piece of drapery as treated in medieval glass, the necessary shading is commonly given by opaque touches between which the color of the glass is left nearly untouched so that the character of the artistic gradation here is like that of shading on paper with a coarse pointed pencil of black chalk, or the like. The shading is done by bold touches and the gradation from complete opacity to unobstructed, translucent color is produced by the constant diminution in thickness and nearness together of these touches, exactly as all the pupils in our art schools are taught drawing without the stump and by means of the point alone. In the flesh, however, attempts are frequently made to reduce this opaque pigment to such thinness that it becomes not wholly opaque—much as we nowadays in house painting thin out oil paint into what we call a "stain"—in the attempt to make the gradation on the flesh softer, as if in this case a graduated tint was substituted for bold cross-hatching and similar point-work. It is as if a pupil in our drawing schools were taught to shade the drapery of his figure with the point alone but to draw the face and hands with the stump because drawing with the point alone would not give sufficiently delicate gradation. It must be said that this attempt has not generally been successful. In the finest ancient glass, the heads will probably be found to be shaded in the same vigorous manner as the drapery; as if with touches of a full brush and opaque pigment alone. The design is so arranged in the mind—the head so appears to the painter's imagination—that he can render it by means of opaque color without any attempt to thin it out to a semi-translucent pigment. It is to be noted, however, that a dry brush or a cloth wrapped round a stick has frequently been used to draw open lines in the solid pigment before firing; and that these open lines produce necessarily a semi-translucent thinning of the pigment.

---

*Stained Glass as an Art. By Henry Holiday. With a colored reproduction of the drawing for "The Creation," twenty collotypes, and many illustrations in the text from designs by Sir Edward Burne-Jones. W. B. Richmond, R. A., and the author. London: Macmillan & Company, Limited. New York: The Macmillan Company. 1896.

The strong background made by the opacity of the lead extended on either side by the painting in thick pigment gives to the unpainted parts such luminosity that the touches of the opaque color which are to serve the purpose of folds of drapery and shadows under eyebrows, rounding of the cheek, and the like, must be put on as the glass picture itself requires. No cartoon done on paper in advance can serve as a precise model for the painter on glass, for it is not until the brilliant dazzling lustre of the translucent medium is before him that he, the painter, can judge of the touches which are needed to modulate his piece of blue, or crimson, or yellow glass into the object which he endeavors to represent, or, at least, to suggest. The piece of blue, crimson, or yellow glass will always be something unexpected; its color is not a constant quantity, but varies in depth as the thickness of the piece of glass varies. The cartoon can only give the general arrangement of the color-masses because the actual colors cannot be appreciated by the designer until he begins to handle the glass itself.

Now, one of the difficulties in the production of stained glass is, and probably has always been, the satisfaction which the artist feels in his cartoon. Perhaps the glass workers of the Middle Ages were least concerned in this way, because we can hardly imagine them exhibiting their cartoons as works of art worthy of anyone's attention. We are bound to believe that those cartoons were made for the workshop alone, and were cut up, or used up, in the workshop without any attempt to show them off in the first place as if they had a life of their own. In our own time things are different, and large surfaces of wall in the exhibitions, as of the New York Architectural League, once a year, are hung with cartoons which are supposed, by a fiction agreed to by artists and public alike, to represent in some way the future windows. That is well enough. If the artist were sure to remember that the cartoon is not what he has been employed to produce, what the public might think of it would be of little moment. The few visitors to the Gallery who care for designing in glass as a noble and independent fine art not very closely allied to opaque painting, such as that upon walls, may be trusted, perhaps, to wait for the window and to use the cartoon merely as a hint that there will be something better worth seeing by and by in such and such a church. Just in the same way the book under consideration is illustrated by photographic copies of the cartoons for important windows. These are supposed to represent those windows and to stand for them although they do so no more than an outline print in a History of Painting represents the masterpiece of Correggio. Indeed, it represents the glass less well than the outline represents the oil painting. It may, indeed, serve as a memorandum of the distribution of parts, but care should be taken to explain that it can do no more than this. The danger is, and, in fact, the mischief is proved to be, in the state of mind of the artist himself, who grows to care about his cartoon and to think of it in some way with undue respect as of a finished composition. This it is so far from being that one may almost say that the most highly-finished and elaborate cartoon is likely to produce the least good window. The process of making a very rich and elaborate window is so complex, the mingling of the pieces of colored glass is such a slow tentative process, the painting upon the glass is so much a personal matter of feeling of the painter as he takes brush in hand and plunges into his work, that no drawing on a large sheet of brown paper, made in advance and for his guidance, can be anything more than a programme, as it might be called—a statement of what the window will be like in its outlines. Even if it is not the chief who is to do the actual painting, the assistant will paint as he knows his chief expects him to paint, and as the traditions of the workshop are. He will not paint exactly as the cartoon seems to instruct him. The lover of glass designing, he who has seen and studied the finest ancient and modern work and loves it, will be the more apt to select for observation in the galleries the cartoons that seem the flattest, the palest and least completely worked up. If a fine window has perished, that which such a student would wish to have preserved from the wreck would be such a flat outline cartoon, together with, if possible, a small scale-color sketch, whether that color sketch had been made in advance to show the general intent of the artist, or afterwards as a memory. These propositions may be elucidated by the extreme difficulty of rendering in modern illustrated books anything of the effect of fine old windows. There is a magnificent work on the glass of Le Mans Cathedral, in which the colors of the glass are given as nearly as was found practicable, and the scale is that of the original. There exist also several valuable books of recent date in which the photograph has been called into use to give, directly from the glass, black and white reproductions of the main outline and main system of light and shade of fine windows, and this, of course, on a much reduced scale. Neither of these two methods of representing windows of colored and painted glass can be called satisfactory, but the peculiar fact is that the latter, the photographic method, is the more interesting and instructive of the two. Such photographic illustrations as are given in the works of Lucien Magne, for instance, come nearer to recording the spirit of ancient glass of fine quality than the elaborate colored plates given by M. Hucher, in the Le Mans collection. Neither small photographs nor large chromo-lithographs give any real idea of the beauty of the window represented, but of the two, the photograph brings the student nearer to the original. All this is merely a way of saying that a design in translucent material cannot be rendered by an opaque drawing or print, and this is advanced merely as a suggestion of the great difficulty which awaits that artist who fancies that his cartoons are capable of giving to his workmen, to himself, or to the public who looks at them, any precise idea of what his window is to be.

These suggestions are made not as in any way commenting upon Mr. Holiday's explanation of his beloved art, or as in any way deteriorating from the excellence of his own way of stating his case. They are intended only to point out the difficulty which he and all writers on the art have to experience in giving illustrations of his own or other men's work and the danger which attends the notion that the opaque design is in any way expressive of the window. It is certain that many of the cartoons of which large and fine photographic reproductions are given in the work before us are finer than the windows; that is to say, that they give the idea of a more advanced and more perfectly successful work of art than the windows in which they may have resulted. If, for instance, the large plate opposite page 86 and numbered Fig. 28 be considered, it will appear that a most elaborate piece of figure drawing, filling four panels of equal size, has been so combined that each of the four panels is worthily filled with a group at once fine in line and fine in mass, and that the four panels together make up a composition, which, if somewhat restless and contorted, is still impressive. It does not follow that the window would be a very fine one, and a somewhat imperfect recollection of that window leads to the conviction that it is not as fine as the cartoon and that it does not even seem as elaborate or as masterly, considered as a design. This is not introduced as a criticism of Mr. Holiday's work as a designer of windows, which question is not before us at present and which it would be impossible to treat without an examination of many important windows in many parts of England and America, but it is intended as a criticism of the school to which Mr. Holiday may be said to belong. In his interesting and instructive text, Mr. Holiday is never weary of insisting on the importance of form in combination with color in modern window designing, but, perhaps, there is a break, or hiatus, as it were, and a lack of consideration in this valuable book as to what should be aimed at in studies of form by the painter in glass. That the form should be severe, in a sense, abstract, with but few details and little effort to express rapid motion or unusual and somewhat distorted attitude; that the severity of medieval and of Renaissance design should be followed, or at least studied with a view to approximate reproduction; that the drawing should be perfectly accurate and scientific, as far as it goes, but that it should not go very far; that the main object of the design in glass should be the display of brilliant and glowing color with the form strictly subordinated to that; all these we take to be conditions precedent for any fine result.

Allusion has been made above to the school to which Mr. Holiday may be said to belong. The principles of this school are nearly those which govern medieval glass but with added modern skill in drawing, especially in drawing the human figure. The outlining, the minor details of the drawing and the modelling into some slight roundness and relief are done by the opaque pigment nearly as was done in the Middle Ages. A modern window, built upon this principle, should be nearly what a thirteenth century window was except that the human figures would be more accurately delineated. As, however, the art of true decorative design has been almost wholly lost to the modern world, it has resulted that modern windows are generally as inferior to the medieval ones in appropriateness, in good taste and in true artistic worth as they are superior to them in science. The attempt to keep in a window by

Burne-Jones as much as possible of the qualities of an oil painting by Burne-Jones, has ended disastrously for the beautiful art of designing in translucent color. All that Mr. Holiday says in his valuable treatise on modern corruptions and the artistic falsity and worthlessness of what is commonly known as Munich glass is true and good, but some part of it may be extended to splendid windows of the English school designed by the best men. The attempt has been to substitute modern decorative feeling for medieval decorative feeling. With that desire every lover of art must sympathize. In that attempt every lover of art must be interested. If there had existed a modern decorative sense, at all equivalent to the decorative sense of Western Europe in the Middle Ages or in the sixteenth century, it might have succeeded; indeed, it must have succeeded. Had the decorative sense existed in the modern world the feeling for what a window should be and should not be, the feeling for propriety, for keeping, for what may be and may not be done, would have been strong enough to guide the modern pictorial sense in the right way. This however, could not be. The modern pictorial sense is strong and active; it is alive with realization of the immediate past and of the present, and with expectations of a clearly foreseen future. Admirable works of art in the way of painting and in the way of figure designs in monochrome are made every day, and the novelties and the innovations are those which healthy progress allows and even causes. There is a modern world of painting worthy of comparison with that of any past time, and what that comparison will result in we cannot now judge. How nearly the painting of our present day, taken in the mass, will compare for excellence with the painting of great epochs in the past, we do not know, but we do know that the comparison will have to be made by posterity. In the world of decoration there is none of this success and energy. Decorative art, as such, is absolutely non-existent. The only graphic ornamentation which has life and originality is the direct application of representative painting, of what might be called, by a slight forcing of the phrase, realistic painting, into the service of adornment. No one now can design a diaper, no one can design a border of scrolls, no one can cut up the surface of a panel into diaper or can fill it with floral ornament. If we have a vase to adorn, what we instinctively do is to lay a sprig of flowers upon its surface, painted as it grows, or not more conventionalized than the unmanageable enamel color makes necessary. The trained workman who could design ornament along traditional lines and as he had learned in his father's or his master's workshop, no longer exists. The complete failure of all the attempts at Gothic revival has had other causes, indeed, but no one cause has been more powerful than this, that there were no workmen left who could carve ornament in stone. In like manner there are no workmen who can paint ornament on walls or on plates or on fans; all our decoration that is worth anything has to be produced by highly trained artists who have been through the regular course of study in the art schools or in the studios of great masters, and who turn their attention away from the more usual quadrangle of canvas to painting on walls or on fans. This is so generally true that the few exceptions are registered in the mind of every student of decorative art. Five or six potteries; three or four makers of furniture; three or four looms where splendid stuffs are woven; these, and such as these, in all the great world of European stock, make but a short list of designers, or groups of designers, who produce decorative work along natural lines of development and of what seems originality; everywhere else there is either direct copying from the ample stores of the past or there is chill nonentity. Under these conditions, the decorative sense may be said to be non-existent. The pictorial sense carries it over the decorative sense, and must do so in ninety-nine cases out of a hundred. The window produced under these conditions is nearly certain to refuse to keep its place in the wall; it is nearly certain to be undignified, because of the crowded and restless grouping of the figures; it is nearly certain to be non-decorative because of the exaggerated gesture and realistic and unconventional pose of the figures. In the work before us, Mr. Holiday speaks again and again of the importance of giving to our glass designs the modern skill which as a matter of course representative drawing requires; but we may be accurate and yet be severe; that is what the windows require. In like manner Mr. Holiday speaks again and again of the supreme importance of color, and brilliant glowing color, in glass, but he insists also on the co-ordinate importance of form. If by this is meant elaborately modulated form, then that is asked for which cannot be had. So, with the matter of light and shade; if light and shade, considered as a principal or important part of a composition, is kept in mind by the designer in glass, his design, considered as a piece of translucent mosaic in color cannot but be ruined. In every piece of decoration one or another principle must prevail and the principle which must prevail in glass designing is that of color in its purest, freshest, most strenuous and richest variety.

It has been said before that the power of designing conventional patterns, diapers, scrolls and such like ornaments, is non-existent among European peoples; it is also disappearing very rapidly in those Eastern lands where European influences are at work. There is one very curious phenomenon to be noted in this connection; it is the appearance of qualities of surface and of texture used as a substitute for the patterns which we cannot design. We moderns have but two ways of adorning a wall or a vase or a metal tray; one is by representative drawing and painting of men, animals and plants nearly as the artist sees them, and nearly as he would paint them on canvas, the other is by means of the textile quality of silk or worsted, the interlacing of basket work, the ribbed and fluted surfaces of matting, the lustrous quality of beaten and embossed metal, the vibratory and cloudy quality of vitrified color, the grain of wood, the veining of marble or alabaster. If there is not money enough to paint the wall with the fully-realized figure subject for which an artist of rank must be employed, the wall shall be hung with white cotton stitched with silk or wool in pale tints hardly visible as a distinct color relieved from the ground, but effecting its general aspect, or faced with tiles or with marble, or wainscoted with wood; or the plastering shall be slightly embossed with a formal chequer or scored with irregular lines. There is no half-way measure. We cannot endure unskillful painting; therefore, we will have none unless we can have the master. We cannot even endure figures drawn on a vase as a Chinese of three centuries ago, or as a Greek of twenty-four centuries ago, would have drawn them; and, therefore, we will have no figures on a vase, but, instead of them, mere dragging and splashing with the colored glaze. This, then, is also to be considered in our glass. As we can draw the figure admirably well, whether in lively action or in severe repose, and as we have the power of producing beautiful surfaces and incalculably varied gradations of color in the accidental gradations of color in the translucent material, let us, then, utilize these two powers and see whether a decoration will not come of them, a decoration different, indeed, from that of the Middle Ages, but, perhaps, on that account the more to be cherished as being our very own. It is probable that such considerations as these have been of weight with those artists, mostly Americans, who have tried to make innovations in the art of decorative glass.

The principle of the so-called American school may, perhaps, be stated in this way. There shall be no painting on the glass that can possibly be avoided. The glass itself shall be produced in such variety of color and with so many gradations and modulations in the shades themselves that almost every conceivable combination of tints, passing one into another, or sharply contrasted, may be obtainable. This glass shall be combined on a glass easel, or in some way by actual observation and comparison by means of transmitted light, the artist himself indicating the combination of the glass as a chief part of his design. The lead sash, which is now to be our only opaque background, is to be used with deliberate purpose to emphasize, to outline, to support, to sustain the linear composition. The forms chosen shall be simple and severe, the human figures at rest or in slow and easy motion, the parts few, the draperies not much subdivided, the backgrounds of landscape, or architecture largely suggestive, without much attempt at detail. If this is a correct statement of that which is, of course, not stated in words, but is in daily execution in our cities, then, it will be seen that the principles which govern such stately mosaics as those of S. Apollinare within the walls at Ravenna are the right ones for glass considered as a decorative art, aiding in the beautifying of our interiors. The superiority in the translucent composition of such simplicity of design, as alone is compatible with such opaque compositions, as in wall mosaic is, we think, evident. A window with few figures, and those in repose, with heavy folds of drapery and little subdivision of parts, with the background a mere suggestion of landscape and sky and the accessories of tree or flowering plant treated with severe conventionalism, is so superior as a decorative composition to the windows crowded with flying, swarming, squirming, restless figures in violent action, and with lilies and roses as near the real thing as the artist knows how to paint them, that no comparison as to their relative merit is possible to one who studies them both.

The American system is obviously nearer to that of the sixteenth century, as illustrated by the Fairford windows, by those of St. Etienne de Beauvais, by those of the Cathedral in the same town, by those of Saint Foy at Conches, by those of Santo Spirito at Florence and by those of the Cathedral of Lucca than it is to medieval glass, properly so-called. This, of course, has been inevitable, because our modern methods of thought in art are much nearer to those of post-Renaissance times than they are to those of the Middle Ages. And it may be stated as a general proposition that the school of glass-workers in America are trying, in a great measure, unconsciously, to combine the large way of figure drawing which they have received from the sixteenth century through modern France, with those methods of subordinate decoration which alone are possible to the modern workman.

The objection which Mr. Holiday makes to this way of working is mainly founded upon the assumption that the American artists are using accident to replace deliberate design. This means, of course, that as all the tints used in a window are those of the glass itself, the artist will inevitably take up the chord of color suggested by the pieces of glass which he is handling and not the chord of color which his artistic instinct bids him confer on the piece of work before him. But this is to confuse uncontrolled and extraneous interference of accident with that accident which may in a sense be thought not so very accidental. As the painter mingles color on the edge of his palette, new color thoughts arise in him which had not come to him until the colors struck his vision. No man, however great his power of abstract thought in art may be, is capable of thinking out a color scheme exactly as he will produce it upon the canvas or wall. The glass in his rack is to the composer of a window what the tube color squeezed upon his palette is to the painter on canvas. It is his palette, it is his group of possibilities; it is that out of which his design is to be made. A piece of green drapery is in his mind, but the exact tints which that piece of drapery is to receive are not more clear to the glass worker than they are to the worker in paint; not more clear, but equally clear; in the one case, and in the other, the actual handling of the color vehicle modifies old ideas and creates new ones as the work of art grows. Let any one see a composer in glass feeling for the exact tint or series of tints which he requires, trying a hundred pieces of glass in vain and then trying two pieces superposed, and then three, the intention being, of course, to combine these pieces permanently as doubling or lining one another, by the process known as plating; let any one see the artist at work in this patient way, and he will change his mind as to the power of accident in glass designing according to this realistic method. Let any one see the cartoon of an important American window, and then see at a later time that cartoon overlaid with the paper patterns cut out for the pieces of glass as they are to be fitted together; like what the children used to call "dissected maps;" and then let him wait a few weeks and study the superb result in its glow of translucent color, and his belief in the power of accident as a principal feature in the production of these windows will disappear.

Space does not allow of a complete comparison of the methods of the best American workers in glass with those of the best Englishmen. Mr. La Farge's name occurs frequently in the pages of Mr. Holiday's book, and his methods, as the chief exponent of a somewhat new style of work in glass, are criticised unfavorably, while the man's ability as an artist is fully recognized. The controversy between the English school and the American school is one of importance; it is founded on really different principles and not on a mere superficial lack of resemblance. But to explain it fully, and still more, to argue the case from the point of view of either side, or of both sides, would be to write a small volume and not the review we have now in hand.

Russell Sturgis.

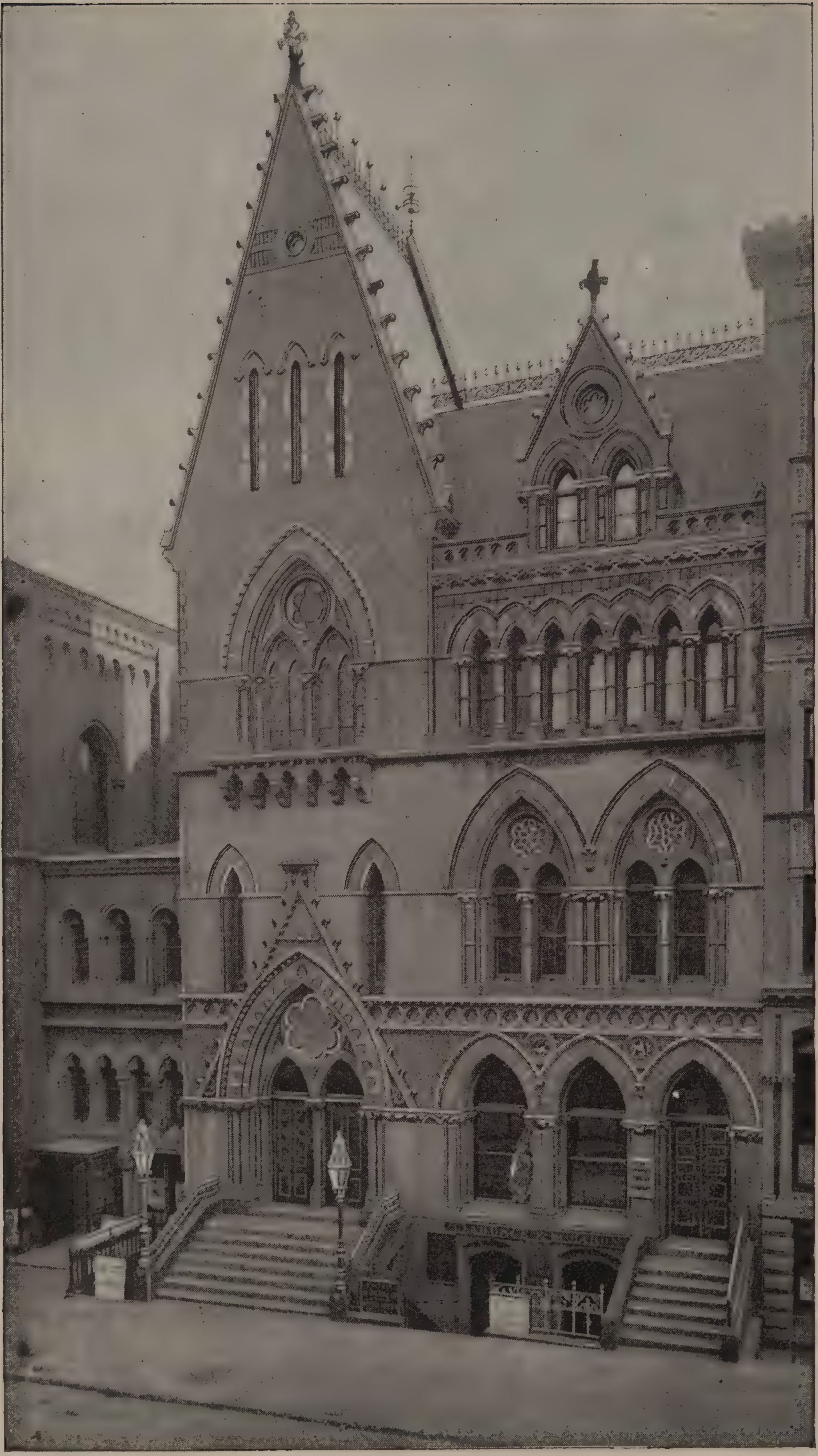
THE WORKS OF CADY, BERG & SEE.

J. Cleveland Cady was born in Providence, R. I., and educated at Trinity College, Hartford (receiving the degree of M. A.). He received his technical training from the professor of architecture of a German university, who, exiled for political reasons, was spending some time in this country. Later he entered a New York office, remaining until he commenced business for himself in 1868. In these earlier and "waiting" years he pursued the study of water colors with Alfred Fredericks. His first building of importance was that of the Brooklyn Art Association. This was soon followed by the North Sheffield Hall and the Peabody Museum of Yale University. In 1881, the firm of J. C. Cady & Co. was formed, by the association of Mr. Berg and Mr. See, who had been for several years his assistants and intimate friends. In 1893, the firm title was changed to Cady, Berg & See.

Louis DeCoppet Berg, born in New York City, 1856, is the son of Albert W. Berg, the organist and composer. He studied architecture at the Royal Polytechnicum, in Stuttgart, and entered the office in 1873. Is the author of "Safe Building," and a member of the Am. Society of Civil Engineers.

Milton See, born in Rochester, N. Y., 1853, is the son of Coles C. See, whose ancestors were among the first settlers of Westchester Co., several having served creditably in the war of the Revolution. He first entered the office of the late Emlen T. Littell, and about 1871, that of Mr. Cady.

A sensitive and enthusiastic American architect, beginning his practice thirty years ago, unless he was diverted from his normal course by some foreign influence, almost inevitably began with Victorian Gothic. That is a phrase of rather baleful import now, so many restless disjointed and crudely colored edifices have been committed in its name, so many more than of the examples of peace and quietness which also illustrate it. But at that time it was a phrase to conjure with and indeed it was "a marvellous good word before it was ill-sorted." No doubt Ruskin's eloquence had much to do with its vogue, but there were practitioners who took it up on the technical even more than on the literary side, who undertook not merely to reproduce but to revive Gothic, and who did in it things true and artistic. and not to be forgotten. The fundamental principle that construction should give its own forms can never become obsolete. If the "style" has been discredited, it is because the practitioners on the one hand confined the application of the principle to the period in which it was without doubt most brilliantly illustrated, but in which the forms were the expressions of a construction no longer current or vernac-

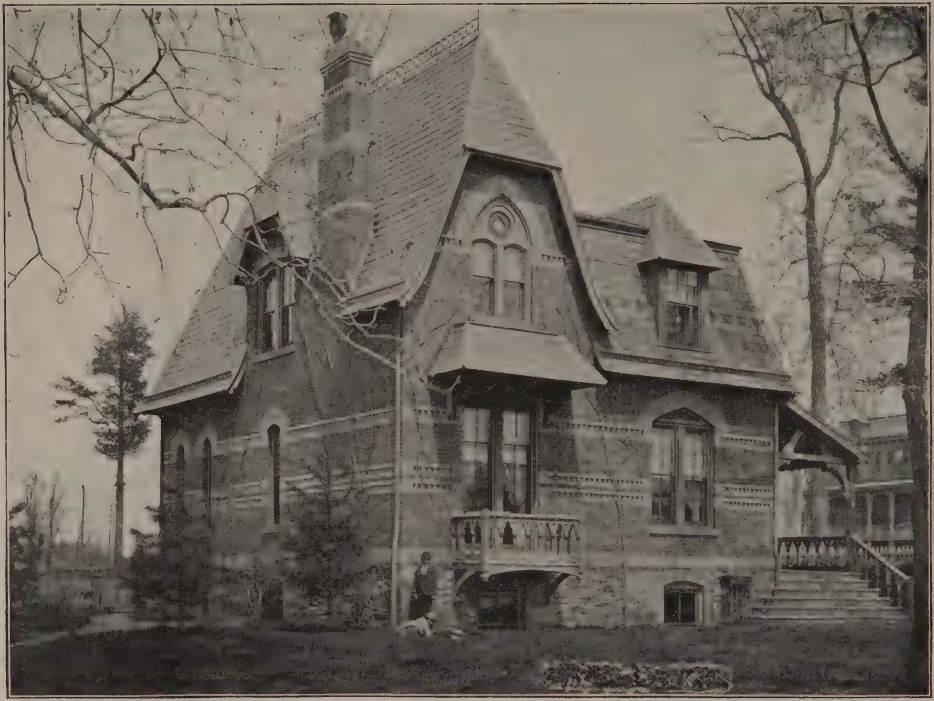


BOSTON PUBLIC LIBRARY

THE BROOKLYN ACADEMY OF DESIGN.
J. C. Cady and Henry M. Corydon, Architects.

ular; on the other because the recklessness of half-education is the more distressing in its results the more freedom the designer is allowed by his style. It may be questionable whether we have had any other buildings better than the best that the Gothic revival gave us; but it cannot be questioned that we have had no other as bad as the worst. Thirty years ago, the revival was at its height. The leaders of the profession in England had in great part outgrown the notion that purity depended upon the actual reproduction of old details, and had learned to compose in their style with freedom and without pedantry. Moreover, they had extended it from ecclesiastical to civic and to domestic architecture with an encouraging measure of success. The competition for the Law Courts was just then in progress. Although the final outcome of this was so disappointing as probably to give the final stroke to the revival, the designs were of singular interest; more interesting probably than those submitted in any English competition before or since. What most architects would probably pronounce to be the finest achievement of the revival, Mr. Burges's design for this structure, though unsuccessful, had made a great impression upon the architects of England and America, and in both countries reminiscences of it may be found in actual buildings.

The first important work of Mr. Cady's, so important, indeed, that for the execution of his design he associated with himself a more experienced practitioner, was the Brooklyn Academy of Design. This was not only a distinctly Gothic work, but it seems to have been in a considerable degree inspired by the design of which I have just spoken. It is not an imitation, however, in any sense that at all diminishes the credit of the later author. The proportion of the stories, the placing and proportioning of the arcade, and the suggestion of the dormer, may very well have been derived from Mr. Burges's work. The preference for French detail over the English which imposed itself upon most of the revivalists and the Italian which Mr. Ruskin's eloquence had imposed upon some of them, which was one of the marks of Mr. Burges's work is equally shown here. But the main motive of the composition—the relation between the narrower and taller front crowned by the steep gable and the broader and lower with its crested roof crowned by the crested roof relieved by the gabled dormer—was quite the young designer's own. It was carried out with unfailing pains and skill and to a most fortunate result. The detail is all thoroughly studied in itself and very successfully adjusted in scale. This success in scale is one of the points that make the work so remarkable as a first essay. But indeed the front has throughout an air of ease and ripeness as far as possible from the crudity which disfigured so many of the works of the revival, and perhaps more than any external influence accounted for its abandonment. If the revival had produced many works as good as this it might have retained its hold upon architects and obtained a hold upon the public. This is as restrained and sober in color as in design. The violent contrasts in which many of the revivalists loved to indulge themselves are carefully avoided, and although seven or eight different tints of natural stone are introduced, the introduction is so discreet, and the result so harmonious that the vivacity imparted by the variety is attained without any loss of the sobriety and repose of monochrome. One would be at a loss to name any later work in its kind which is more effective. It gained greatly when it was built, by being a member of an extremely interesting group. It adjoined the long and solid and somewhat sombre façade of the Academy of Music, itself one of the marked successes of the Gothic revival, and it confronted another product of that revival in the Mercantile Library, a picturesque and effective front. The buildings are all there to-day; but the effect of ensemble which they made a quarter of a century ago has been utterly destroyed by unneighborly neighbors which have since ar-



RESIDENCE.
St. Nicholas Ave., New York City.

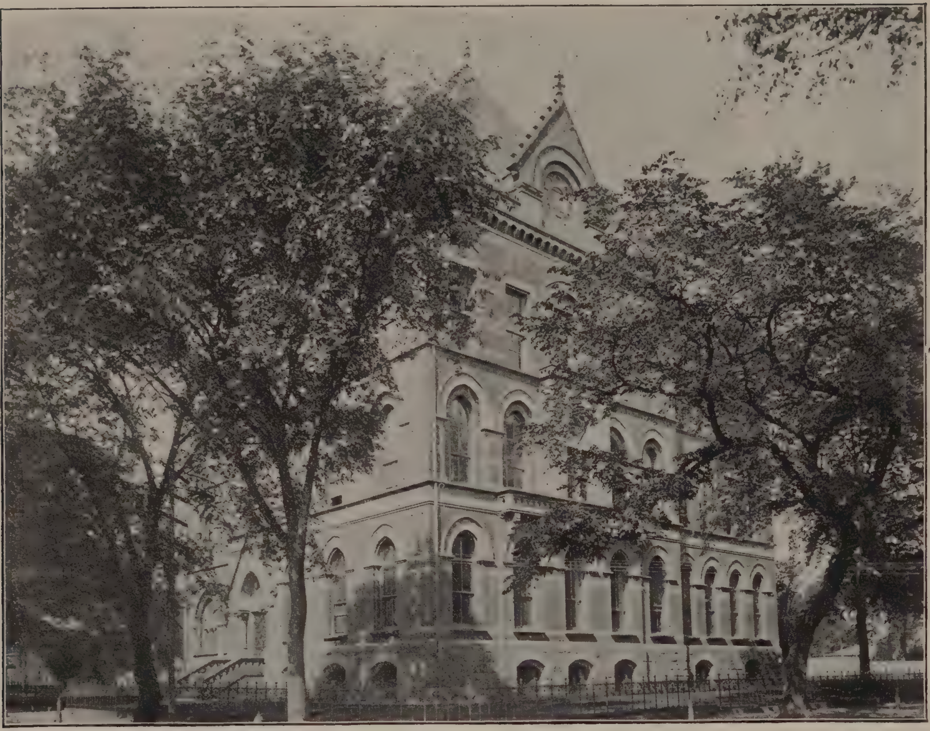
rived. These are of varying degrees of demerit in themselves, but the only thing they show in common is a manifestation of disrespect, not only for each other but for their predecessors. But if one wishes to see what the promise was that was broken by the abandonment of the revival, there is no place in this country where he can see it to better advantage.

While the Brooklyn Art Building is the most elaborate and costly of its author's secular works in Gothic, there are others that exhibit, on a smaller scale, the same qualities of design. One of these is a house in St. Nicholas avenue, which was suburban at the time of its erection, but has long since been erased or transmogrified beyond recognition by the march of improvement. It was a cottage of a story and a half in red brick banded with buff, of very moderate dimensions and simple treatment, which nevertheless derived a picturesque and agreeable aspect from the disposition of its parts, half of it being covered with the mansard of the period, while the other was carried up to two complete stories and crowned with a roof of very steep pitch against which at the side were relieved a dormer and a tall chimney, and which at the end was hipped into a hood over the gable which was pierced with the pointed window that formed, after the roof itself, the chief feature of the house, and chiefly designated its style. That was the day of small things, evidently, with the architect as well as with the client. But the evidence that this unpretentious dwelling afforded that intelligent and artistic pains had been ungrudgingly bestowed upon every detail of the design made it a particularly welcome object, especially in what was then and still elsewhere is the distressing ugliness of suburban New York. The owner who should now desire to have so much thought devoted to the expenditure of so little money would have far to seek.

Another early work of Mr. Cady's that was erected under equally rigid limitations and even more discouraging conditions may still be seen in that part of New York of which the new Criminal Court is the latest and the most full-blown architectural ornament. This is, or was, an Italian school in Leonard street, an extremely simple front, in which there was evidently no money available for decoration. A brick superstructure, of which the red is relieved with buff, with no visible roof, surmounts a brownstone basement, with flat arches. The front is divided into three bays and four stories. It is of no style, being merely the straightforward fulfillment of practical requirements and expression of the structure. But the disposition of voids and solids, the relation of the stories, and the relation of the bays have been so well studied that the building is a very agreeable object, and that it is especially instructive to compare its modesty with the pretentious vulgarity of the courthouse around the corner.

The first of the long series of buildings which Mr. Cady and his firm have designed for Yale was prepared under equally stringent limitations of cost. This was what is now known as North Sheffield Hall, and so careful, indeed, was the committee which had it in charge lest the appropriation should be exceeded that they directed the preparation of a design without informing the architect where, or for what institution it was to be built. The precaution may have been justified, but obviously it did not conduce to the exact appropriateness of the building to its site and its surroundings. The practical requirements and the practical limitations issued is a flat-roofed brick box of three stories, with no other features than a porch on one side and an apsidal extension on another. The latter feature is more effective than the former, which is neither very taking in itself nor very congruous with the building to which it is attached. The architecture, however, is really in the treatment of the walls and is as satisfactory a solution as could have been expected of so vague a problem. The lower two stories become by the continuity of the openings and the withdrawal from their plane of the transomes that mark the floor-lines a single and predominant feature, and the arcade above them with its machicolated cornice becomes an appendage to the principal motive. The piers are visibly ample, although the principal stage rather suffer from the misfortune by which the terminal piers are narrower than the intermediate. The arcade is very well designed indeed, both in itself and with reference to the substructure, and the effect of the design is very much enhanced by the employment of the second color of the brickwork, which is here applied with unusual skill and discretion. Below the springing of the main arches, the wall is a monochrome, but for the definition of the bases of the piers, while the lighter color is used to mark the impost and to express the construction of the arch. In the upper arcade it is much more freely introduced, in bands as well as in bases and arches, and the cornice is faced with it, and the building thus effectively finished, for the attic is, I believe, a subsequent addition.

This work, like the last, is of no style or at least is designated as Gothic only by the fact that the architecture is merely the exposition of the structure. Its author's next contribution to the architecture of Yale is quite consciously and avowedly Gothic. This was the Peabody Museum in which, of course, the designer was aware to what neighbors he had to conform. The Art building, and the chapel and the dormitories that were intended to supplement the brick barracks, comprised all the "architecturesque" buildings then erected or projected for Yale, and indicated that Victorian Gothic was to prevail upon the campus. What was in fact built of the Peabody Museum cannot, of course, be fairly judged without reference to its intention. It is in fact but a fragment, a wing, comprising one pavillion and one connecting curtain of a project that comprised a correspond-



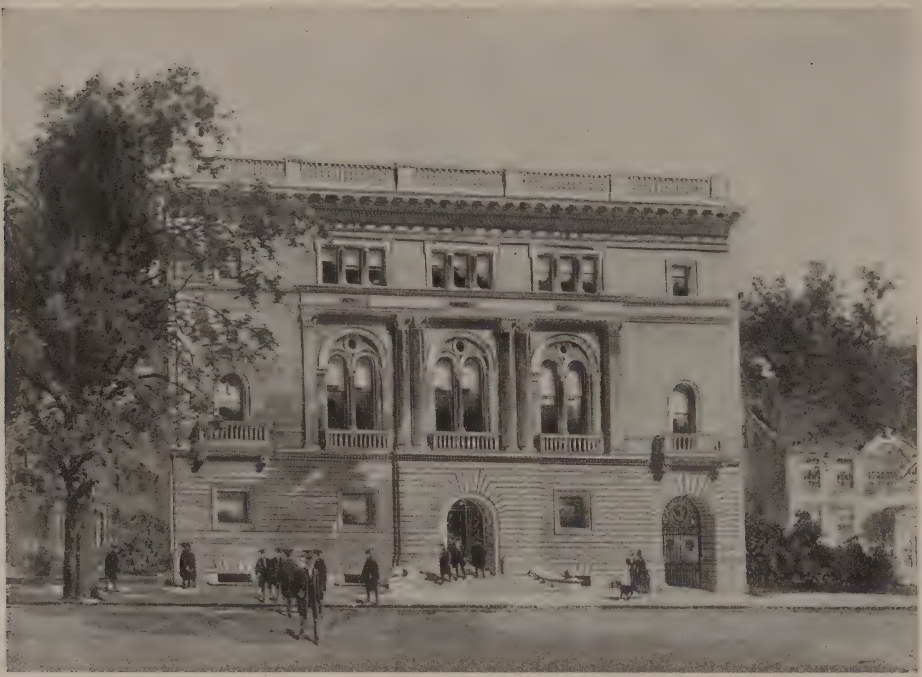
PEABODY MUSEUM.

Yale College. New Haven, Conn.

ing wing and a loftier and more ornate centre, crowned with a central gable and flanked by polygonal towers. The fragment is highly promising as a fraction of the general scheme, and is not without interest in itself. It is noteworthy for its unusual scale among the college buildings, which have otherwise become so heterogeneous. This is fixed by the height of the stories, something over twenty feet, which in turn is the result of a requirement for galleries in the principal exhibition rooms. Provision for the cases and the need of abundant light determined the size of the openings and the intervals between them, and this requirement operated unfavorably on the architecture, huddling the openings much closer than a consideration of the best architectural effect would have admitted. The actual arrangement attenuates the piers, especially and painfully, on one front, the corner pier, and leaves the architect to seek at the top of the building for the expanses of wall surface that are so much more effectual at the base. It is questionable, in view of the inexorable requirements, whether a better effect would not have been gained by spanning the lower openings with lintels, and reserving the arcade for the superstructure which is in fact rather bald by comparison. Nevertheless the fragment makes an impression of stateliness, much enhanced by the simplicity of the steep roof, relieved only by a single dormer in each front. The effect of the combination of material, red pressed brick and Nova Scotia stone, is very good; the detail of the doorway, the cornice and the crocketed gables scholarly in design and effective in scale, and the fragment, in spite of its fragmentariness and of its drawbacks, an impressive piece of work.

The connection of Mr. Cady and his firm with the building of Yale has continued until now. The buildings just noted are among the latest of his essays in Victorian Gothic. The series of his works there shows more or less the architectural vicissitudes to which the campus of every old and growing college bear witness, and none more than that of Yale. In fact, if an architect called in to add to the existing buildings of any of the old colleges made it his first care to conform to what he found he would be at a loss, so irrelevant are the existing buildings to each other. If he undertook to make his work conform to what might be erected thereafter, even for a decade to come, his difficulties would be greatly increased, for in American architecture we know not what even a lustre may bring forth. The reversion to Romanesque immediately followed the Gothic revival, or followed it after a brief interregnum of Queen Anne, of which at Yale it is fortunately not necessary to take account. Dwight Hall, which is the Y. M. C. A. of the University, and the Memorial Library, are the two contributions of our architect to the Richardsonian phase of Yale architecture. Neither of them is by any means an extreme example. Perhaps the more Richardsonian of the two is the former, which is very simple, very massive, very rugged, and which aims to make its effect merely by the force of its masses crowned with large expanses of unbroken roof. In this it is fairly successful. By avoiding the exaggerations whereby Richardson so loudly called attention to his intention and effectually forbade apathy on the part of the most careless or preoccupied spectator, much of the peculiar effectiveness of his work must be lost. The voussoires are not so deep, the columns not so stout, the features not so insistent. Decorum, so to say, is gained at some expense of effectiveness. The same may in part be said of the Memorial Library. The piers of the porch seem affectedly rude and simple, and would gain by a more elaborate modelling into the sheaves of columns that form one of the most attractive features of Provençal architecture, and the ruggedness of the wall seems somewhat excessive considering the general treatment. But the openings are effectively distributed and effectively designed. The relation of the stories is such as to avoid the monotony threatened by the extreme simplicity of the outline. The detail strikes in scale, the just mean between extravagance and ineffectual minuteness, and the polygonal annex is well adjusted to the main structure. Finally, the contrast of color between the red of the wrought work and the gray field of wall gives vivacity without disturbing the repose of the work. This is one of the most successful of the university buildings, and it exhibits a desire to conform to the rest, so far as conformity is possible to a designer who finds it also necessary to be "in the movement" and to show that he knows the current mode.

In the latest of the contributions of the firm to the architecture of Yale, the ruling motive seems to be to make sure of conforming not only to what is but to what may be. I have already indicated the difficulty of carrying out this laudable intention. In order to obtain even an approximate success in it, it is necessary to avoid as much as possible the labelling one's own work with the badges of any particular style. Accordingly the two dormitories, the Sheffield Chemical laboratory and the Law School Building, are all plain and simple structures, and as little as may be "examples" of any historical mode of building. The two dormitories, White Hall and Berkeley Hall, are two mansions which have nothing in particular of collegiate, but seek their architectural effect by the distribution and grouping of their simple openings, by fortifying them with as large masses of wall as possible in the right places and by the refinement and careful execution of such ornamental detail as is very sparingly introduced. The enclosure by a decorative railing of the court between them secures and denotes privacy and gives occasion also for a striking feature. For the rest, they have not, at a glance, the air of college dormitories in particular, but of eligible mansions which might be habitations in any city, and their aspect is not so much cloistral, in spite of the



LAW SCHOOL, YALE UNIVERSITY. (1897.)
New Haven, Conn.

exclusion of the railing and the lodge, as that of "a comfortable bourgeoisie." This mode of designing has the advantage of securing what we have assumed to be its object. That is to say, these plain and solid buildings, besides being inoffensive and even satisfactory in themselves, cannot very well become incongruous with anything that may be executed in their neighborhood. One may find them a little dull, but they neither are nor can become ridiculous or offensive. They will be effective foils to whatever may ensue of richer and more monumental, just as the Jacobean and Georgian dwellings in the English cathedral-closes are effective foils to the minster. In the one case as in the other, the spectator ought to be grateful to the designer for forbearing to obtrude his own work to the detriment of its actual or its possible neighbors.

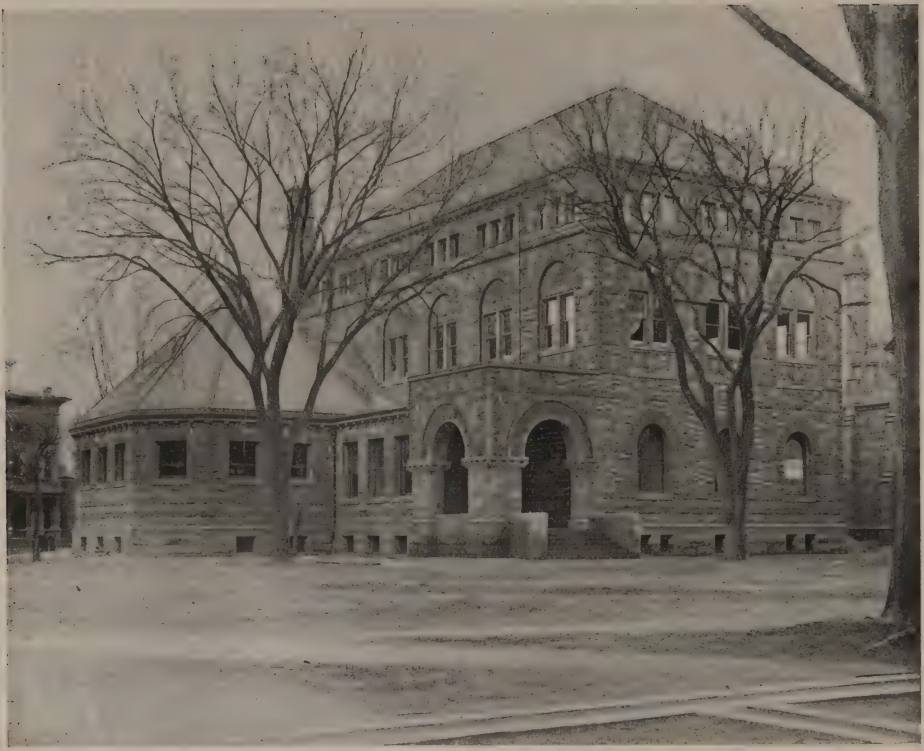
Something of the same kind may be said of the Sheffield Chemical Laboratory. This goes well enough with North Sheffield Hall, erected a quarter of a century earlier, though it is far from being Victorian Gothic, and, indeed, is not designated as of any historical style, though the cornice shows a reminiscence of mediaevalism. Its effect comes from the solidity and sobriety of its treatment. The corner piers are kept as broad and as plain as possible and even reinforced by a slight projection, and thus strongly framing the front. The object of grouping the lower two stories by continuing the openings through them is evidently to make them together the predominant feature of the front and the two upper stories, if there be, indeed, two are united in themselves and separated from what is below, so as to form a single and subordinate feature. But the result of this disposition is to give to the openings a spindling aspect which rather contradicts than enhances the effect gained by the breadth and simplicity of the general composition.

The front designed for the Law School building, owes its effect to the same qualities of solidity and sobriety,

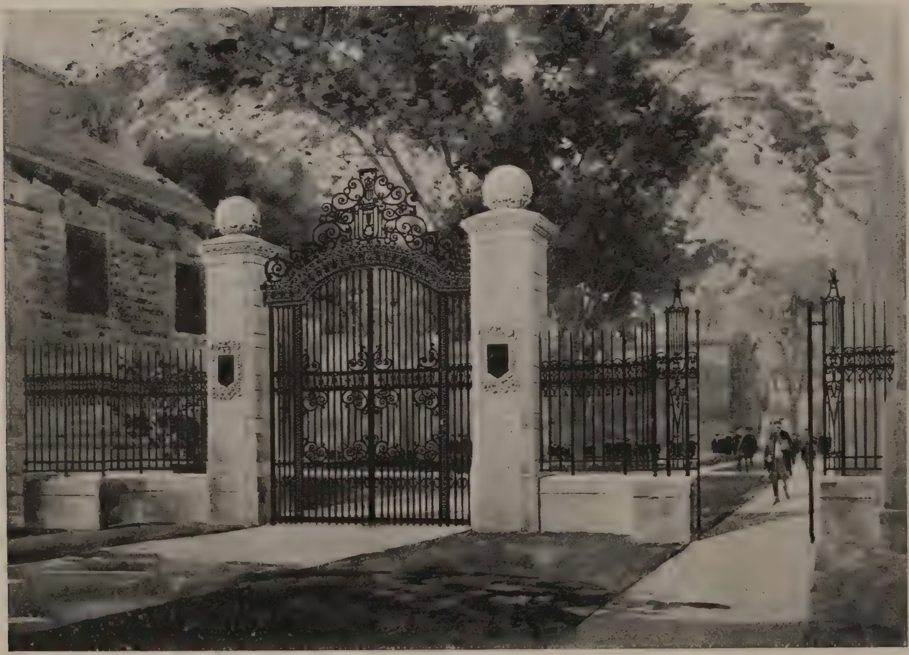
THE YALE INFIRMARY. New Haven, Conn.

DWIGHT HALL AND BERKELEY HALL. New Haven, Conn.

BOSTON PUBLIC LIBRARY

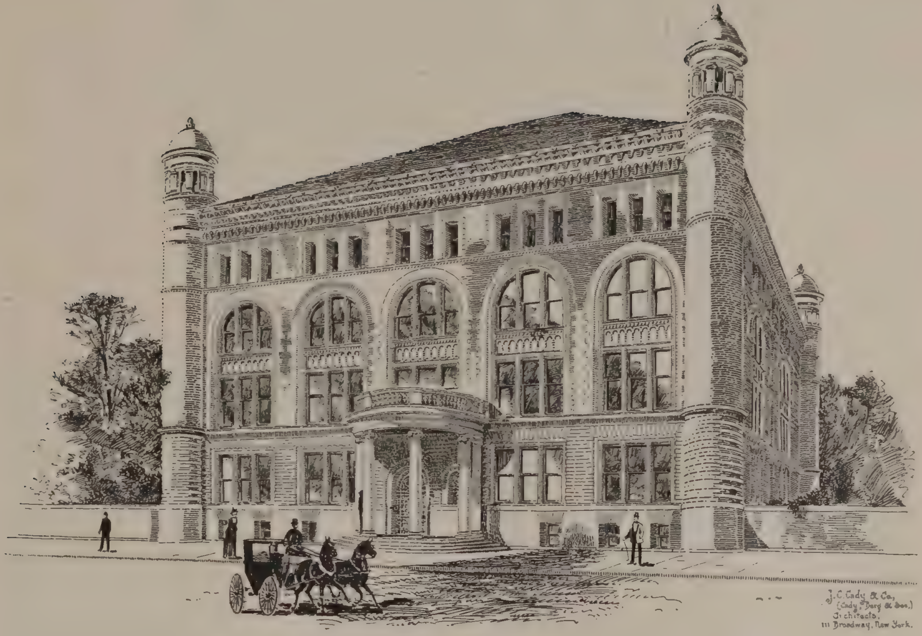


THE YALE LIBRARY. New Haven, Conn.



FARNHAM MEMORIAL GATEWAY. Yale College.

BOSTON PUBLIC LIBRARY.



WINCHESTER HALL, SHEFFIELD SCIENTIFIC SCHOOL. (1891.)

New Haven, Conn.

BRIDGE IN CENTRAL PARK (1883).

New York City.

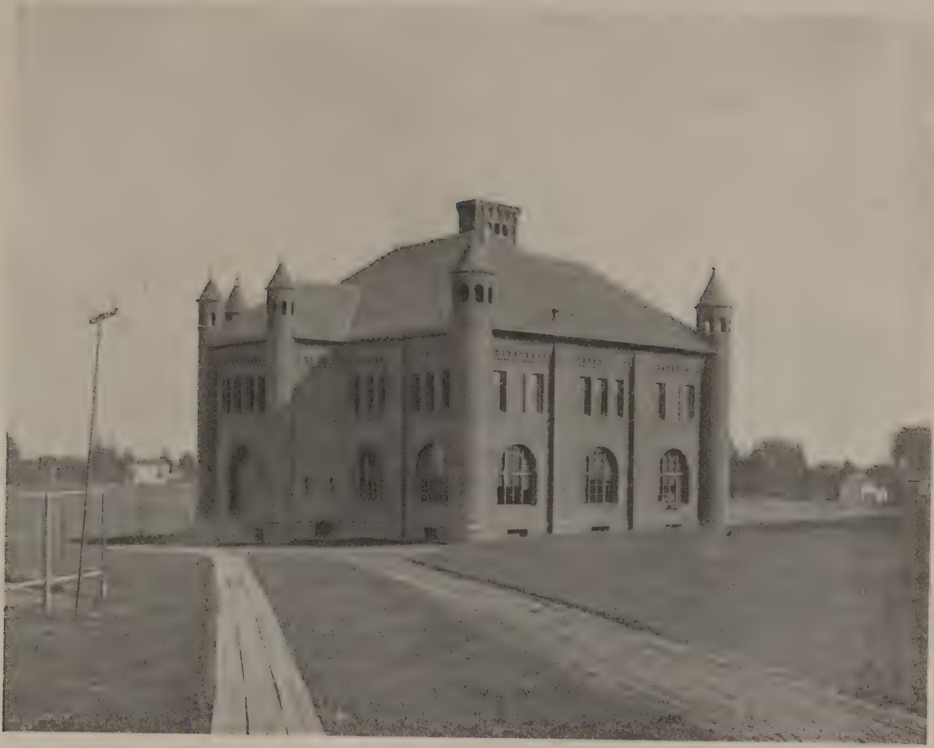
BOSTON PUBLIC LIBRARY

MORGAN HALL (1888).
(Gift of late Governor Morgan.)

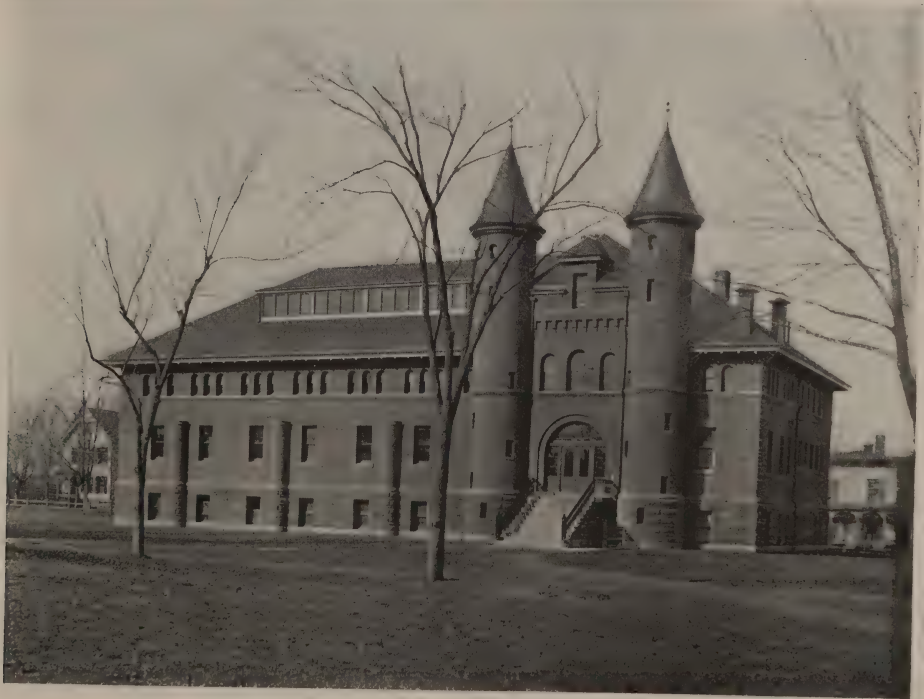
Williams College.

WILLIAMS COLLEGE.
GYMNASIUM, WILLIAMSTOWN.
MASS.

BOSTON PUBLIC LIBRARY

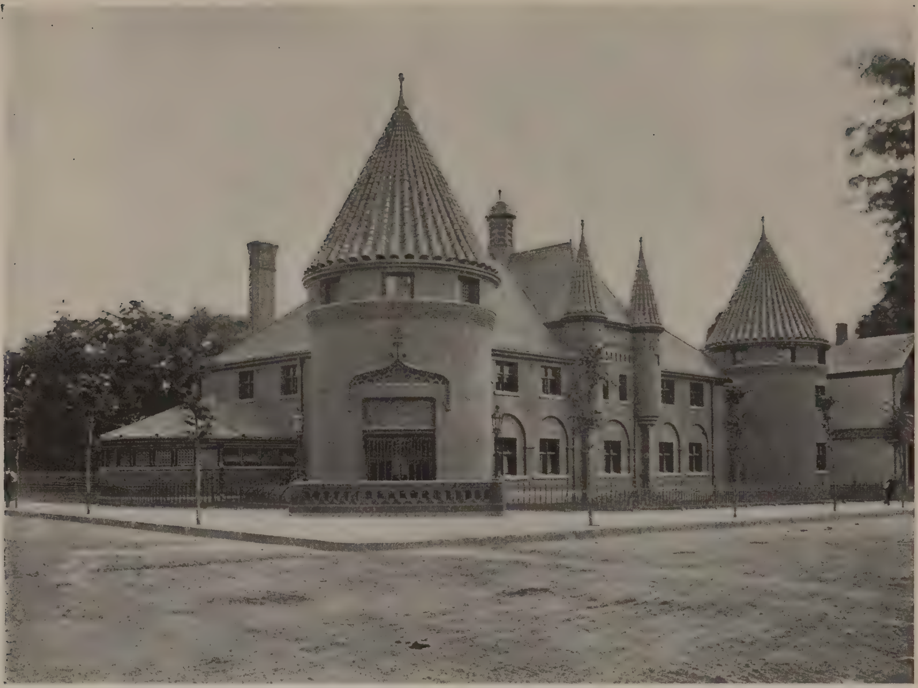


JARVIS HALL OF SCIENCE (1888). Trinity College, Hartford, Conn.

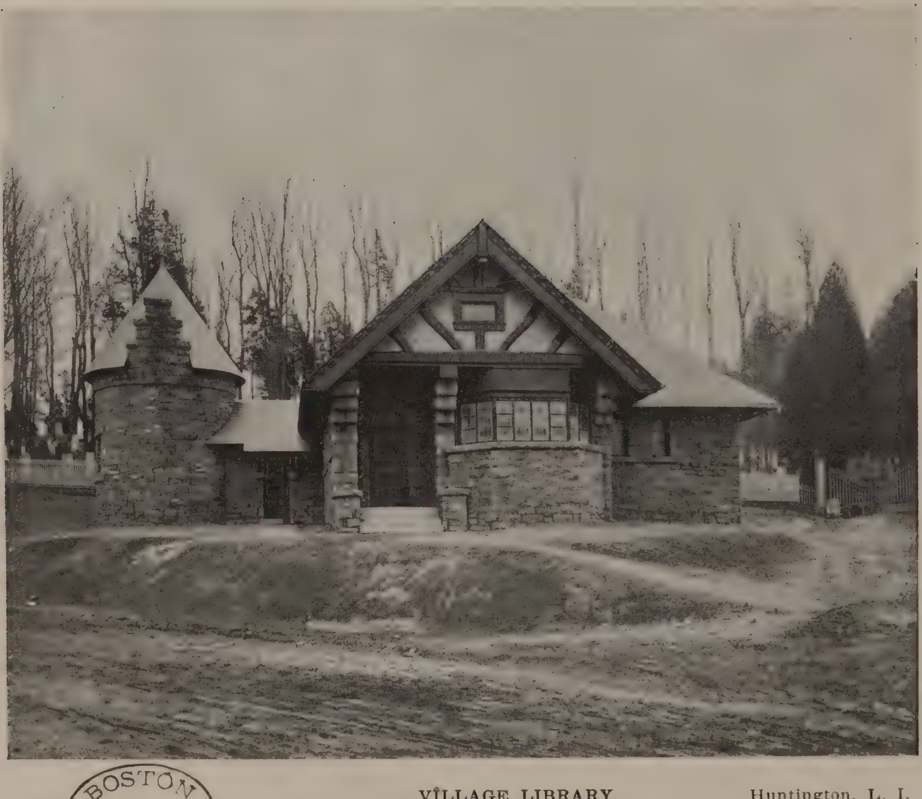


GYMNASIUM WESLEYAN UNIVERSITY. Middletown, Conn.

BOSTON PUBLIC LIBRARY



GYMNASIUM. New Rochelle, N. Y.



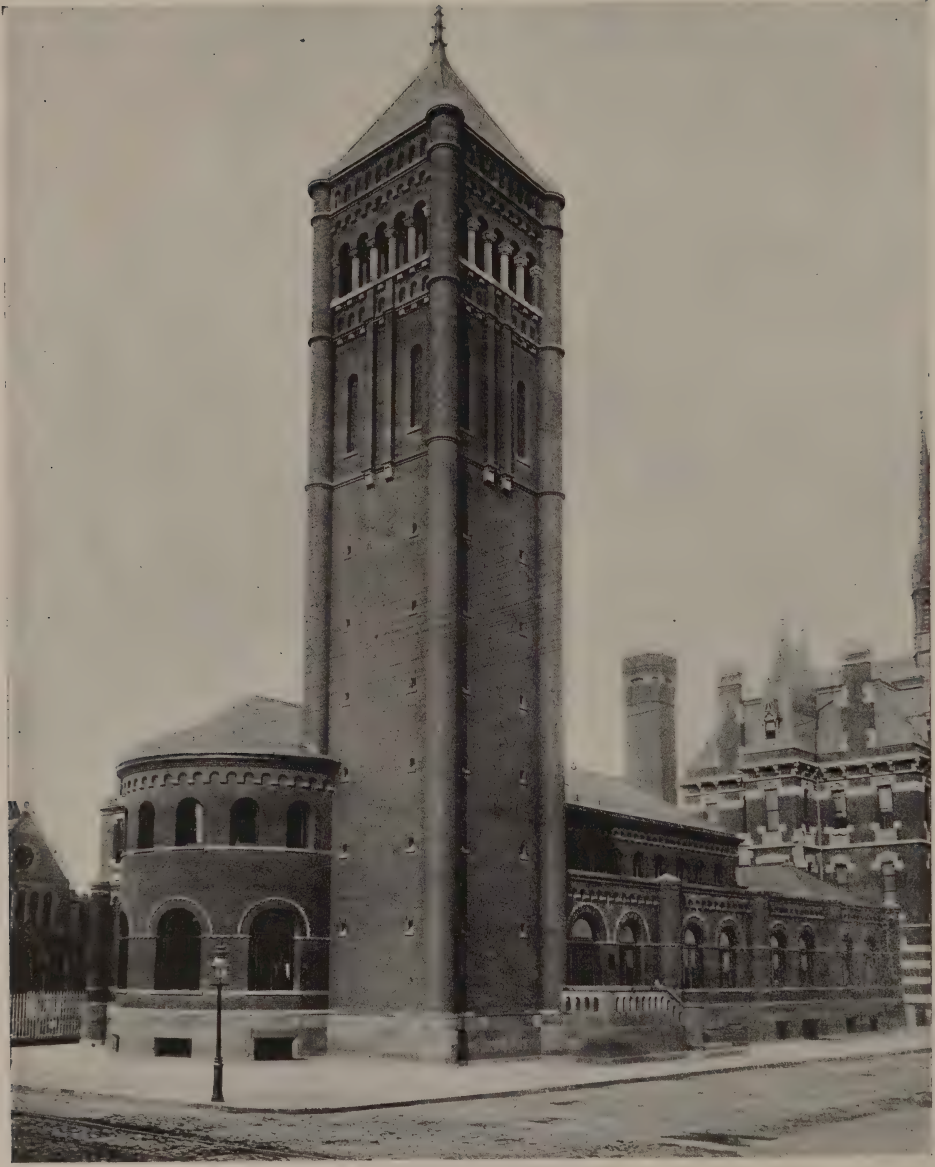
VILLAGE LIBRARY. Huntington, L. I.

BOSTON PUBLIC LIBRARY

but it is much more elaborately and artistically carried out, and is a far more successful composition. This is composed in a style, denoted mainly by the coupled columns of the principal story as in general "classic," although the arches doubled under a large relieving arch, with the head pierced with a rudiment of tracery are a survival of mediaeval work. There is, however, no incongruity in the form except from a strictly scholastic point of view, and the general result is that of those earliest arches of the Italian Renaissance, in which classic detail is introduced without the reduction of the composition to Vitruvian formula. The building is by no means an "example," and will go with anything in reason that may be brought into its neighborhood, while the effect of it by itself is excellent. The designer was fortunate in finding that his requirements admitted of a base so nearly unbroken, although it seems they compelled him to place the largest opening in it too near to one end for the best effect, but still not so as grievously to disturb the repose that comes from the massiveness and simplicity of the treatment, and that is accentuated rather than weakened by the other openings. The composition both laterally and vertically, is very successful. The relation of the three stories to each other is a rhymthical relation, and the solidity of the sides gives value to the more open triple feature of the centre, to which, indeed, the rest of the front is but an effective setting. There is nothing especially collegiate, it is true, in the aspect of the building nor is its expression very highly specialized. It might be a public building for any one of many purposes. But it is a dignified and imposing front, an ornament to Yale and to New Haven.

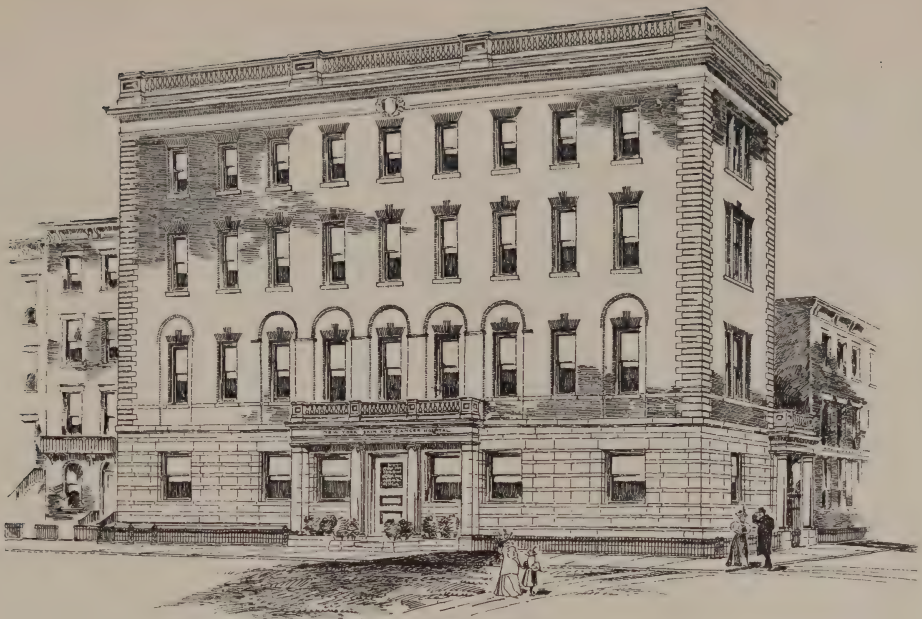
The last that we shall consider of the Yale buildings is much more specific in intention, and seems to be very happy in carrying out its intention. It is the Yale infirmary, and it was evidently the architect's aim to provide a refuge for sick students that should not repel them or their visitors by its institutional appearance. There has been provided for there an old-fashioned mansion, of which the air is exclusively and attractively domestic, and of which only the rather unusual extent would indicate that it was anything but a home. Even in extent it has been outdone if not by many of its prototypes, by a great many of the modern reproductions and imitations of them, but I know of none which more completely reduces the charm of the old county-house without a too literal reproduction of their details.

Such an attainment was, of course, quite out of the question in a city hospital of the first-class, such as the Presbyterian Hospital, which Mr. Cady was employed to reconstruct after its partial demolition by a fire, which left of the original institution, as designed by Mr. Hunt early in "the seventies," only the Administration building still available. Here there was no question of conformity. Even if Mr. Hunt himself had been called in to do over again his own work, it is highly unlikely that he would have recurred to the phase of his professional development which these buildings indicated, and through which he had long passed. Indeed, the administration building which was spared by the fire was that part of his design which was best worth saving. While the talent it shows is undeniable, the vivacity imparted to it in the first place by its design, and in the second by the startling contrast of color, was so excessive as to render it ineligible as a model for the group of new buildings that was to adjoin and surround it. This was evidently the feeling of his successor in the work, whose additions were in a monochrome of red brick and red terra cotta, relieved with only so much introduction of brown sandstone as not to disturb the general sense of monochrome. They were also in a sober and moderate version of Romanesque which has nothing in common with the liveliness of the modern Parisian version of French Gothic. As a hospital according to the experts, the Presbyterian hospital is a model in its kind,

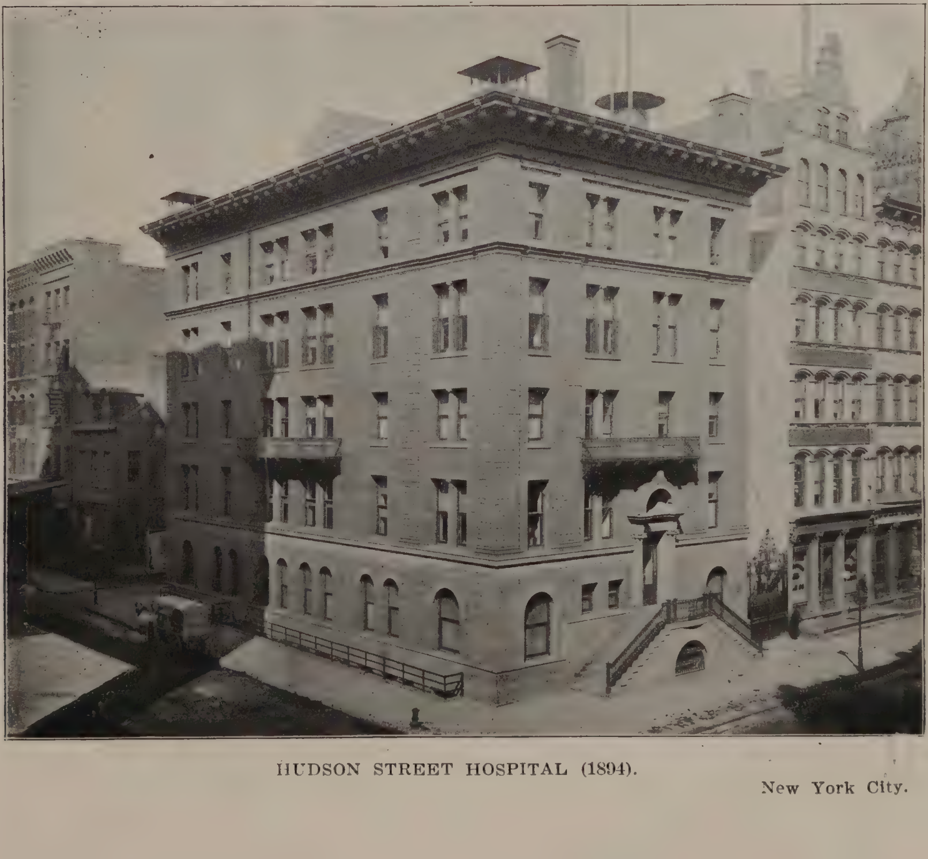


Madison Avenue. PRESBYTERIAN HOSPITAL. New York City.

BOSTON PUBLIC LIBRARY


NEW YORK SKIN AND CANCER HOSPITAL

NEW YORK SKIN AND CANCER HOSPITAL
NEW BUILDING



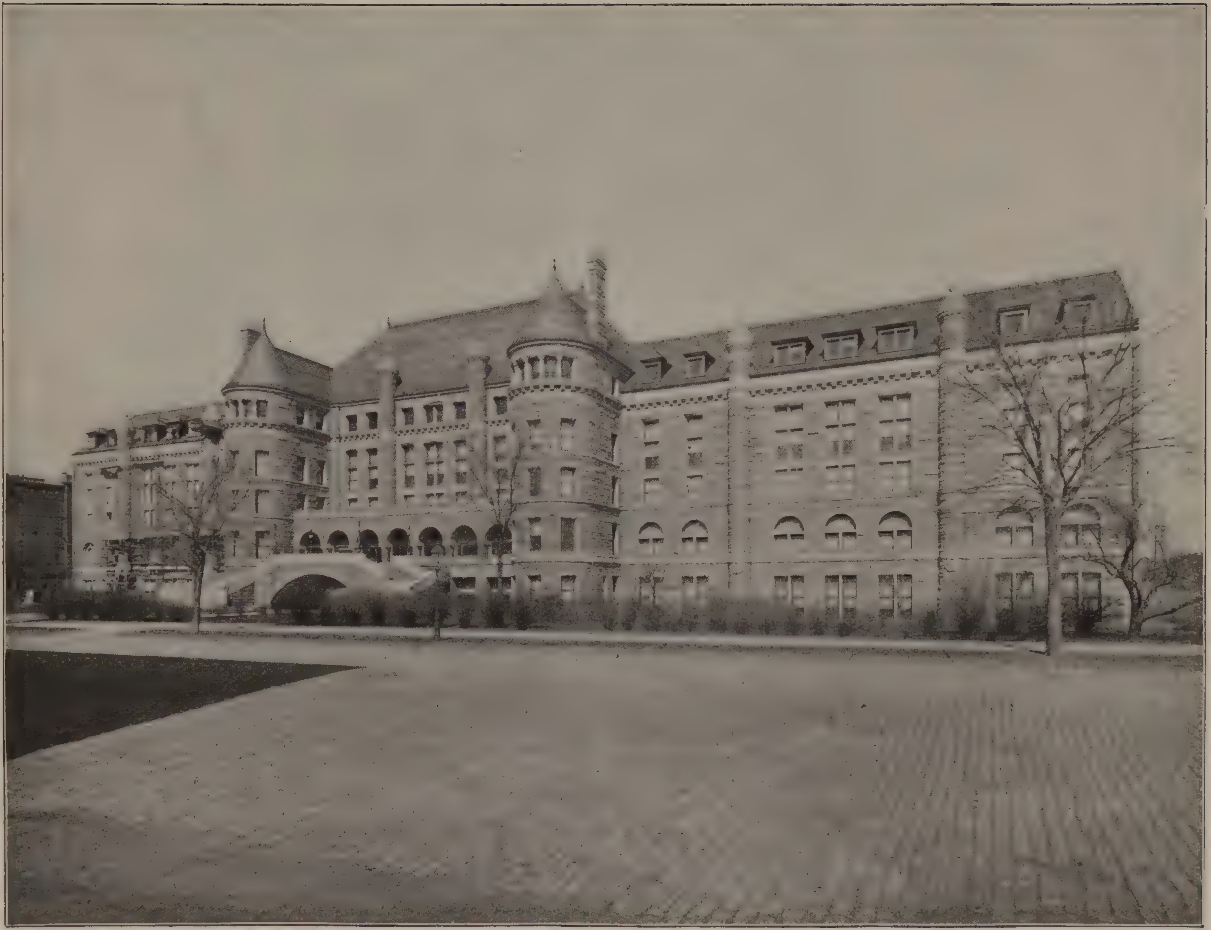
HUDSON STREET HOSPITAL (1894).

New York City.

BOSTO
PUBLI
IBRA

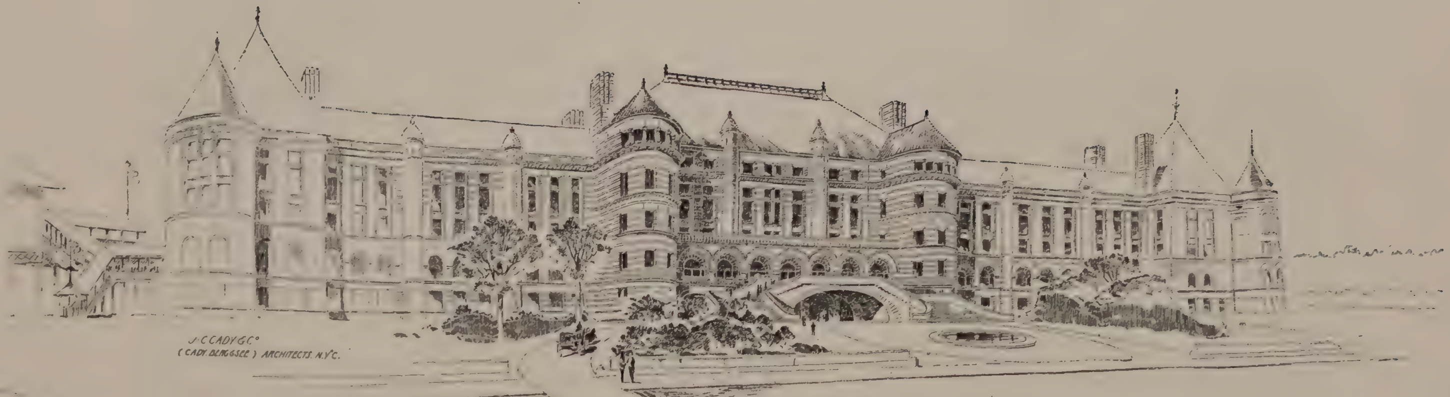
and the dispositions of the architect have left nothing to be desired in the way of light and ventilation and communication. Our concern, however, is with the architecture only and we have to own that neither the relation of the stories nor the fenestration, which have been dictated by purely utilitarian considerations, has proved to be favorable to architectural effect. The wards cannot aspire to any higher praise than that of inoffensiveness. The only architectural opportunities occurred in the design of the dependencies, the operating-room at one end of the south front and the dispensary at the other, with the square tower attached to it which looks purely monumental, but in fact serves the highly practical purpose of supplying ventilation for the whole group of buildings. The operating-room is a modest edifice of two stories, square in plan, with a peaked roof that is a very agreeable object in spite of its limited dimensions and in spite or because of its simplicity of treatment, the openings being well placed, carefully detailed and serving to punctuate and enhance the simple expanses of wall space. The counterparting feature deserves a higher praise, and indeed seems to me one of the firm's most distinguished successes. The requirements of the dispensary worked out naturally into a church-like structure of which the nave was the waiting room, and the bays of the aisles, devoted in the Roman use to chapels and confessionals became private consulting rooms, while the nave was continued to an apsidal termination. It is this apse that combines so happily with the tower, of which the stark shaft so increases the value, both of the openings of the main building and of its own upper stages, one variegated merely by application and recesses in its brickwork, and the other developed. above an emphatic band idiomatically treated in baked clay, into the likeness though not the use of a belfry stage. There are few more welcome examples in our street architecture of thoroughly studied and artistic design.

Another and even more conspicuous example of institutional architecture is the Museum of Natural History, on the west side of Central Park. This occupies an extensive and conspicuous site, and occupies it very worthily, although the composition is evidently incomplete in the present state of its execution. The long range of building needs to be still further prolonged by the addition of the terminal pavilions which will extend it from avenue to avenue, and will supply counterparting and completing features to the central mass. The façade will then have the five fold division for which the design evidently calls, whereas what is already built is but the central pavilion, with the two curtains that are meant to count only as intervals in the completed front, and are not meant to be looked at for their own sake. But the designer has been much more fortunate here than in the somewhat similar case of the Peabody Museum in New Haven; in the first place, that he has been allowed to build. first the dominant central mass from which the remainder can with some safety be inferred, instead of the flanking pavilion which leaves the uninformed spectator entirely at the mercy of conjecture; in the second place, because he has assurance of the execution of the entire design. The Romanesque which he has chosen for his style is by no means the aggressive and importunate phase of that style. It is carried out with so much decorum and moderation, indeed, that the style of the building is scarcely designated except by the unmistakable badges of the large, round piers that subdivide both the pavilion and the curtains. It is questionable whether even these have not been designed too exclusively to designate the style. Though their finials are effectively relieved against the roofs, and give point and variety to the composition, it seems that this purpose might have been equally well served by the application of buttresses modelled less with reference to an historical style and more to their function of re-inforcement, with the stages and offsets which



MUSEUM OF NATURAL HISTORY. New York City.

BOSTON PUBLIC



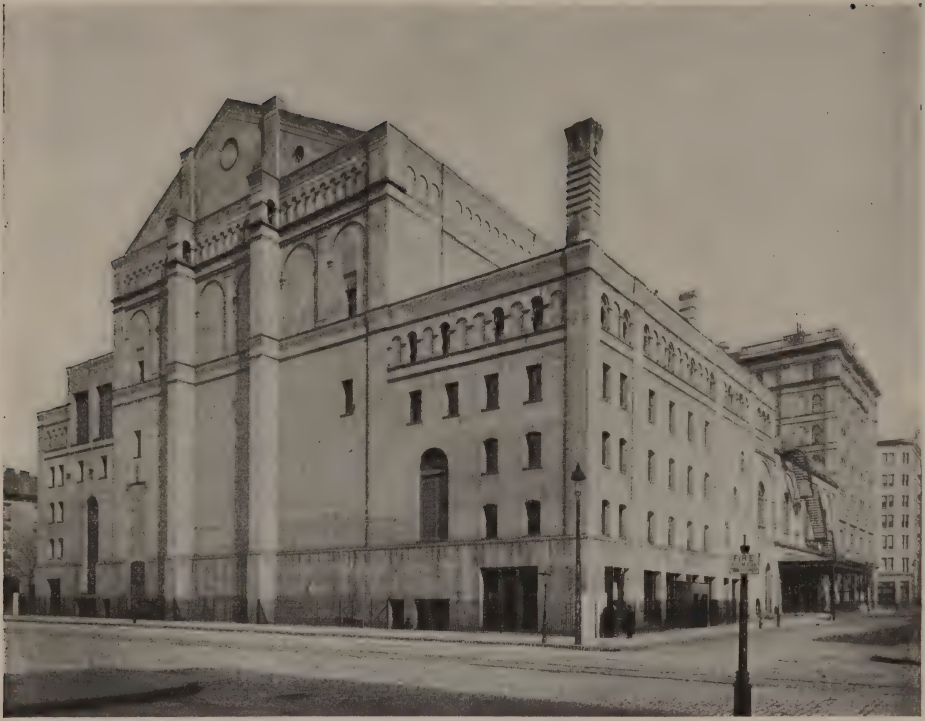
J·C CADY & C°
(CADY. BERG & SEE) ARCHITECTS. N.Y.C.

NEW BUILDINGS
AMERICAN MUSEUM of NATURAL HISTORY · N·Y·C·

BOS
PUBLIC
LIBRARY

that function implies, and that were recognized in design only after the Romanesque had ceased to be. However that may be, it will not be disputed that the façade is successful and impressive. It is worthy of its conspicuous place and of its very unusual dimensions. It will be, when it is completed, probably the longest front on Manhattan Island, and an important requisite of the design was to get the full benefit of this lateral extension. Such an extent is so valuable in itself that it behooves a designer to be especially careful, lest in variegating and decorating it to avoid monotony he dissipate some part of its inherent effect. This has been successfully looked out for in the design of the Museum of Natural History. The central building is, as should be, a predominant feature, and it is differentiated from the flanking walls not only by a greater height, emphasized by the steep and simple roof, and by a difference of fenestration, but by a considerable projection of its flanking towers. These devices give sufficient detachment and relief to the centre, but the principal lines of the flanking walls are so emphatically continued across it, and so closely connect it that the disposition rather enhances than interrupts the effect of the lateral extent. Moreover, the centre is notably well designed in itself. The flanking towers are well designed and well adjusted to their places. The archway, which at once carries the approach to the main floor and gives access to the basement, is a striking feature, and the arcaded loggia again emphasizes the principal dimension and is in itself well proportioned and well detailed. Add that the architect has been very fortunate in his material, having obtained a red granite as strong in color as brownstone, and equally effective rough-hewn or polished, and you have the sources of the architectural success of one of the most successful of our public buildings.

The Metropolitan Opera House is a work which no longer supplies the material for a just judgment of its authors. The interior, in the course of the reconstruction it underwent after a fire, has been, perhaps it would be harsh to say vulgarized, but at any rate deprived of whatever individuality it originally had and reduced to the common level of theatrical architecture. But even in its original state, the conditions were very hampering to a designer whose work, when it was done, would inevitably be compared with the achievements of architects who were unhampered. With such a public monument as the opera house of Paris or of Vienna it would be very unjust to compare our opera house, in the construction of which the necessity prevailed of reducing to a minimum both "fixed charges" and "operating expenses." We ought to be too grateful for what has been done by the public-spirited men who have provided and maintained the opera house at their own expense to carp at them for not going to an expense even more lavish. Such an expense would have been required to add to the practical fulfilment of the purpose of the place a monumental expression of that purpose. In the interior the economy of space entails painful results, not, indeed, in the auditorium itself, but in the entrance hall, which might have been an imposing feature like that of the Paris Opera or of the Congressional Library, but which is reduced by want of space and money to a mere stairway, of which only one flight is visible at a time, the next being cut off from view by the flooring over of the well at each stage. In the exterior the mutilation is even more lamentable. For on the main front all that appears of the opera house is the central third, and this is flanked by buildings taller than itself, of which the only connection with it is that they contribute to its revenues. The problem presented by this collocation is really not soluble. Mr. Cady perhaps took the most judicious course in treating his monument and its adjuncts in the same material but distinguishing by richness of treatment the front of the opera house above the fronts of the apartment houses which were distinguished above

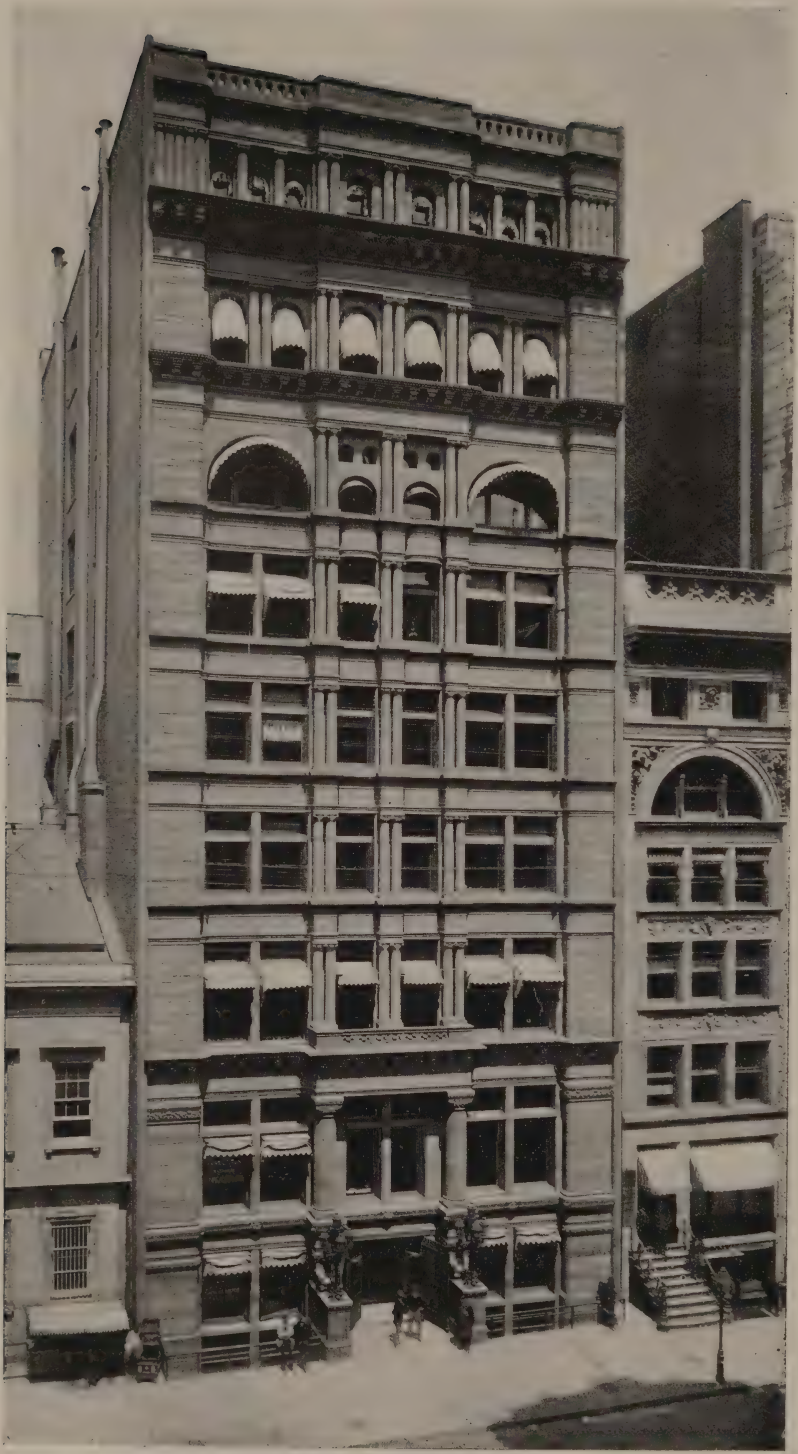


METROPOLITAN OPERA HOUSE (Rear View). New York City.

it by greater height. The result of this course, however, inevitably is that casual inspection regards the whole front as of one piece, and estimates it in the lump. This necessarily does injustice to the design of the centre, which masks the staircase hall. If the corners had been reserved from building instead of being filled out to the limits of the plot, so that this central pavilion stood by itself, it would be recognized as a scholarly, rich and harmonious composition, whereas, being flanked by structures which have the annoying air of belonging to it, though they really do not, it makes scarcely any effect at all. Possibly it might have been signalized to its advantage by the use of a different material, but that would have been awkward also, seeing that only the corners are devoted to baser uses, and that into one even of these a dependency of the opera is extended. To omit the flanking buildings altogether would have been the only real solution of the architectural problem. The entrance pavilion thus detached and isolated would have done to its own design the justice which it is deprived of doing by being flanked by huge utilitarian erections.

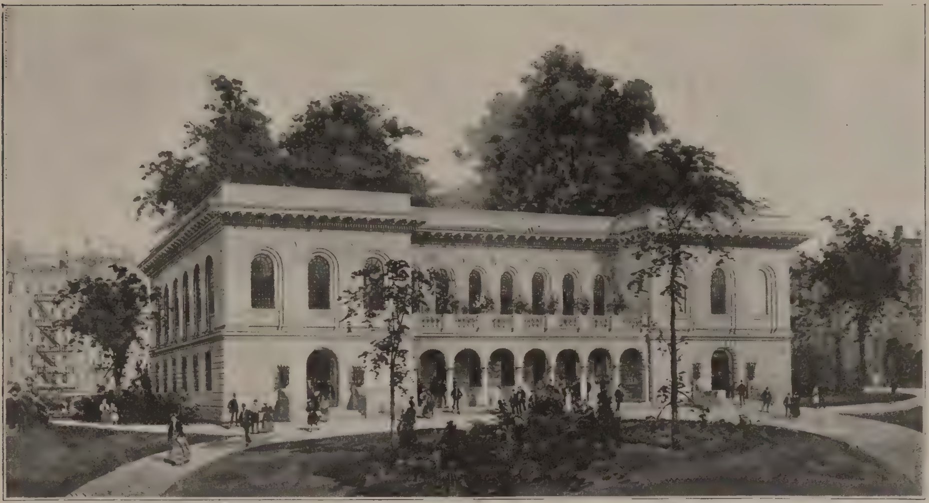
All this is a misfortune, but one is bound also to recognize that the architecture is not so effective as it might be in the matters in which the architect was left unhampered. Its defects are defects only and not blemishes, and criticism of them must be negative. The whole, along with an undeniable gracefulness, lacks vigor. The general treatment is as expressive as it could be considering the annoying interpolations at the angles. The three great elements, entrance-hall, auditorium and stage, are distinctly indicated on the outside, and the last is notably well carried out. The most forcible piece of design in the building is the rear wall, the center of which is mainly blank, with only such openings as emphasize its expanse and its massiveness. Its massiveness is still further and very effectively emphasized by the projection of two great buttresses. These are a structural necessity, since a stage wall must carry itself without interior staying, and they have contributed a needful architectural feature, of a vigor for which one looks in vain over the more architecturesque fronts. The drawings, indeed, promise a more effective building than the actual structure. The large relieving arches of the sides, for example, lose in execution the importance they possess in the drawings. Perhaps this is in part due to the failure of the designer to make due allowance for his material. The material is very good in itself, a light buff brick that wears very well and that, after fourteen years, gives no sign of shabbiness, but it is a material in which a slight projection or recess is of little avail. It is used in conjunction with terra cotta of the same tint, which would now afford opportunities for a much more emphatic treatment. But, in 1883, both designers and manufacturers were much more timid in the handling of terra cotta than they have since become, and this work seems to illustrate that timidity. At any rate, the detail is unduly minute in scale. Excepting the fortunate vigor of the stage wall, the only impressive piece of design is the entrance pavilion, and this has been robbed of its legitimate expression as aforesaid. Upon the whole one may say of the opera house that it is a good story marred in the telling, a design deprived of its due effect in part by the conditions of the problem, and in part by the architect's fear of loudness and exaggeration.

Of the commercial buildings of the firm, the Gallatin Bank in Wall street is perhaps the most costly and conspicuous. It is not a "sky-scraper" in the newest sense. Although the firm have also contributed to the tower-like buildings of New York, their work in that kind has been so hampered by the conditions of them, the most hampering condition being the limitation of the frontage to that of a city lot, or even less, that it would not be fair to judge them by work executed under such requirements. But although the Gallatin Bank reaches the respectable altitude of nine stories, and is perhaps twice and a half as high as it is wide, it is not a sky-scraper for the reason that it is a structure of real walls of masonry, and not a cage of metal panelled in masonry. Of its nine stories, two are given to the basement and one each to two attics, the intermediate five being grouped as the principal division of the building and strongly separated by entablatures from the basement on the one hand and the attic on the other. This is a rational distribution, although in fact, from the most usual points of view, the attics count for little in the general effect, by reason of their distance from the eye and of the projection of the entablature underneath. The lateral division is triple and is maintained in the attic by a projection at the centre, while this central part is decorated in the principal division with three pairs of columns in each of the five stories. This decoration is the most conspicuous feature in the building, and may almost be called its leading motive. It is rather a grandiose feature in itself, but it cannot be said to constitute an effective front. The outer piers are left plain but for the prolongation across them of the projecting mouldings of the entablatures, and the lateral bays are also simply treated. The ornament is concentrated in the columns at the centre. Although the horizontal lines are strong the superposition of five orders makes the columns in effect continuous, and the central feature has thus a spindling aspect that is very disturbing to the repose the front would have had, in virtue of the power of the piers and transoms, and the arrangement of the openings, if the orders had been omitted. The effect of them in the attics, however, is very good, though weakened by repetition, since here they are extended across the front, forming a gallery between the piers, and since they are very emphatically

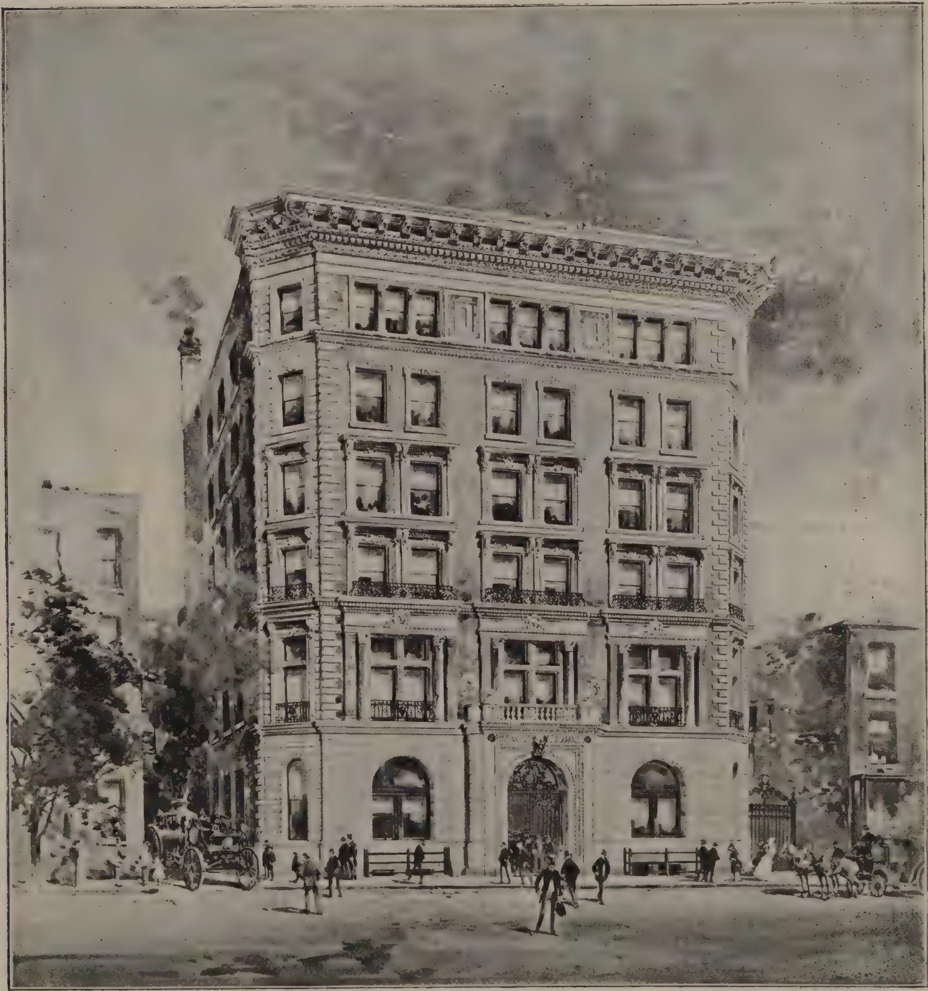


THE GALLATIN BANK (1885). New York City.

BOSTON PUBLIC LIBRARY



DESIGN FOR PUBLIC BATHS (1897). New York City.



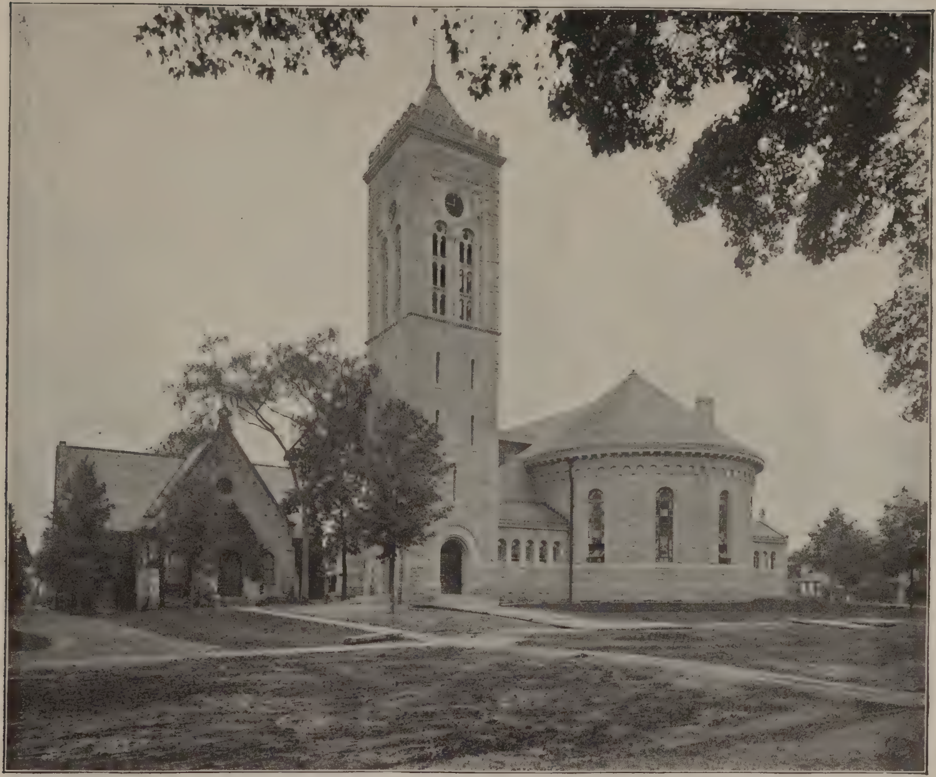
PHOENIX MUTUAL LIFE INSURANCE CO.'S BUILDING (1897). Hartford, Conn.

BOSTON PUBLIC LIBRARY

framed by the projecting cornices. If the lower attic had been plainly treated as a foil to the richness of the upper, and if the order had been left off from the main division altogether, the front would have been extremely satisfactory. As it is, the detail throughout is carefully studied and successful in scale. The classic employed is so very free and eclectic that in the basement it ceases to be classic and takes on a distinctly Byzantine air. This basement, to my mind, is by far the best thing in the front. It is one of the best schemes that our street architecture has to show for the treatment of the entrance of a commercial building. The difficulty in this is to signalize the entrance and give it importance without making it unduly large and without misstating the facts of the case. This is admirably managed in the Gallatin Bank. The entrance is signalized by the two massive columns above it on the principal story, and by the buttresses that flank it. But it is at the same time made clear that the two columns are not really part of the entrance, but only appropriate crowning members for its massive piers. The detail of all this is capital, the buttresses have power and vigor, and the Byzantine leafage of the basement-cornice is designed and carved with great spirit. The whole basement is a very exemplary specimen of commercial architecture, and, indeed, is of a richness that would be appropriate to public architecture.

I am compelled, for want of space, to pass by much of the work of the firm which invites comment, but which, however interesting, is episodical, so as to be able to consider a series of buildings which are essays towards the solution essentially of the same problem. The problem is that of the modern Protestant church, and the series extends over twenty years, for the first of the series, for our purpose, is the church erected at Bridgeport quite so long ago. Everybody recognizes that the Protestant church, what in England would be called a "dissenting chapel," presents a problem that what may be called the sacerdotal churches of the past styles do not meet. Everybody ought to recognize the importance of the problem, for the country church in the United States at least ought to be what Coleridge called the Anglican parish-church, the centre of civilization in its sphere of influence. It is first an auditorium, a place in which to hear preaching, and, secondly, it is a place of social assembly. The convenience of hearing and seeing is the primary requirement, and many are the devices to which it has been resorted to attain it. It long ago became evident that it could not be attained by the reproduction of "the long-drawn aisle and fretted vault," of mediaeval architecture, and that the modern theatre supplied a more eligible type than the ancient minister. Some architects have frankly built what one of them called "a theatre with ecclesiastical details," but it is impossible to adjust to this interior an ecclesiastical exterior, and the complete abandonment of the ecclesiastical exterior has, in many cases, been attended with a vulgarizing of the edifice. To build what is wanted, and, at the same time, to give it dignity and churchliness, has been the aim of many architects, and of none more than of the firm now under consideration. The earliest essay, the Methodist church at Bridgeport, shows an unreserved acceptance of the auditorium idea and abandonment of the ecclesiastical type, the plan is octagonal, and the posts and piers support a lantern, or cimborio, from which the interior receives a great part of its light. At that time, however, Victorian Gothic prevailed, and all the details were in the prevailing mode, whereas it is plain that it is not in that style, if in any recognized style, that such a scheme can be worked out to the best advantage. But the church was none the less an interesting experiment which attained an encouraging measure of success.

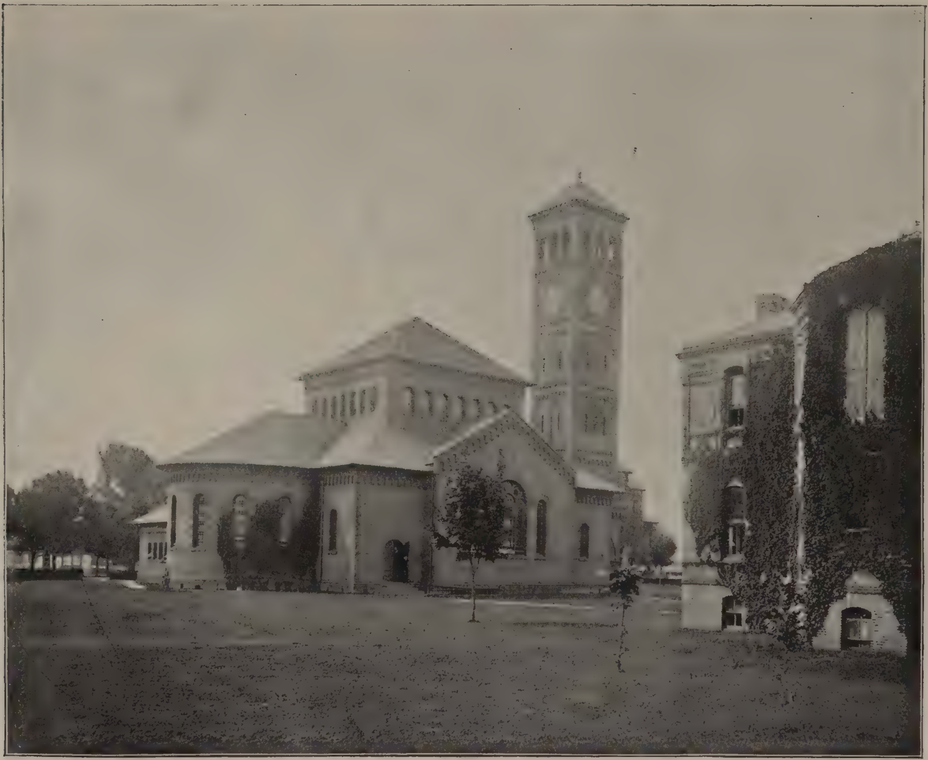
The South Church of Morristown, the next in point of time of the series, is an attempt to fulfil the practical re-



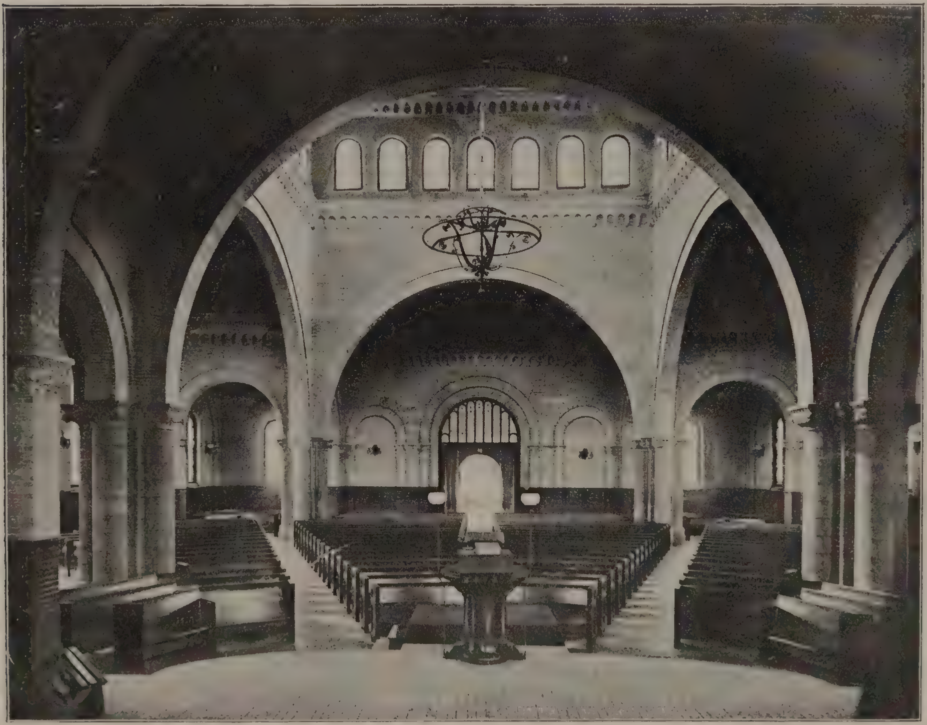
THE SOUTH PRESBYTERIAN CHURCH. Morristown, N. J.

quirements without too wide a departure from the traditional forms of church architecture. The exterior is a rectangle of brown stone, with a gabled front, flanked on one side by a carriage-porch and on the other by the unbroken shaft of a massive campanile with a steep slated hood. The belfry-stage shows two tall canopied openings, of which the steep lufferboards are hung with red tiles. The only intimations that are given on the outside of any peculiarity in the arrangement of the church are that the gable window is rather unusually broad and low, and that the wall which frames a like opening on the side, instead of being gabled, is covered by a hip roof, above which is seen a row of low openings in the main roof, which give additional light to the interior. The interior is virtually reduced to what would be the crossing in the cathedral arrangement. Four stout posts enclose a square of about 45 feet and support a quadrangular lantern, of which two sides are pierced with rows of low windows, the third and fourth sides, or the front and rear, continuing the fenestration as decoration. One bay is formed on each side of the square and one at each corner. The ceiling of the lantern is flat, but the ceilings of the outlying dependencies are open-timbered and decorations of the actual roof construction. The detail is of the Victorian Gothic of the period. That of the roof construction is apt and expressive, and all of it is interesting, though it suffers pretty uniformly from excess in scale. Upon the whole, the interior is impressive and churchly, and the exterior dignified, quiet and harmonious.

This plan, of a central square carried above the rest of the building and

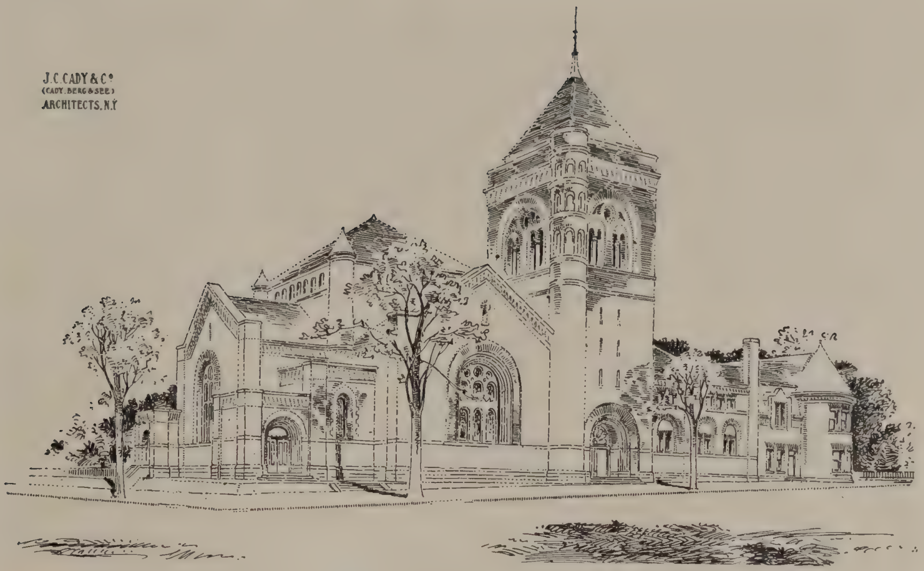


HAMPTON MEMORIAL CHURCH, HAMPTON INSTITUTE. Hampton, Va.

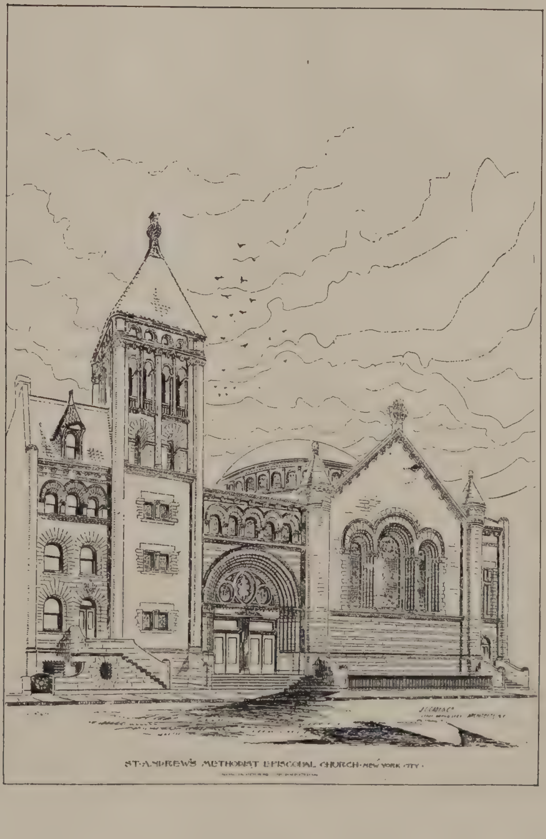


INTERIOR OF CHURCH, HAMPTON INSTITUTE. Hampton, Va.

BOSTON PUBLIC LIBRARY



NEW YORK AVENUE CHURCH (1892). Brooklyn, N. Y.



ST·ANDREW'S METHODIST EPISCOPAL CHURCH·NEW YORK CITY·

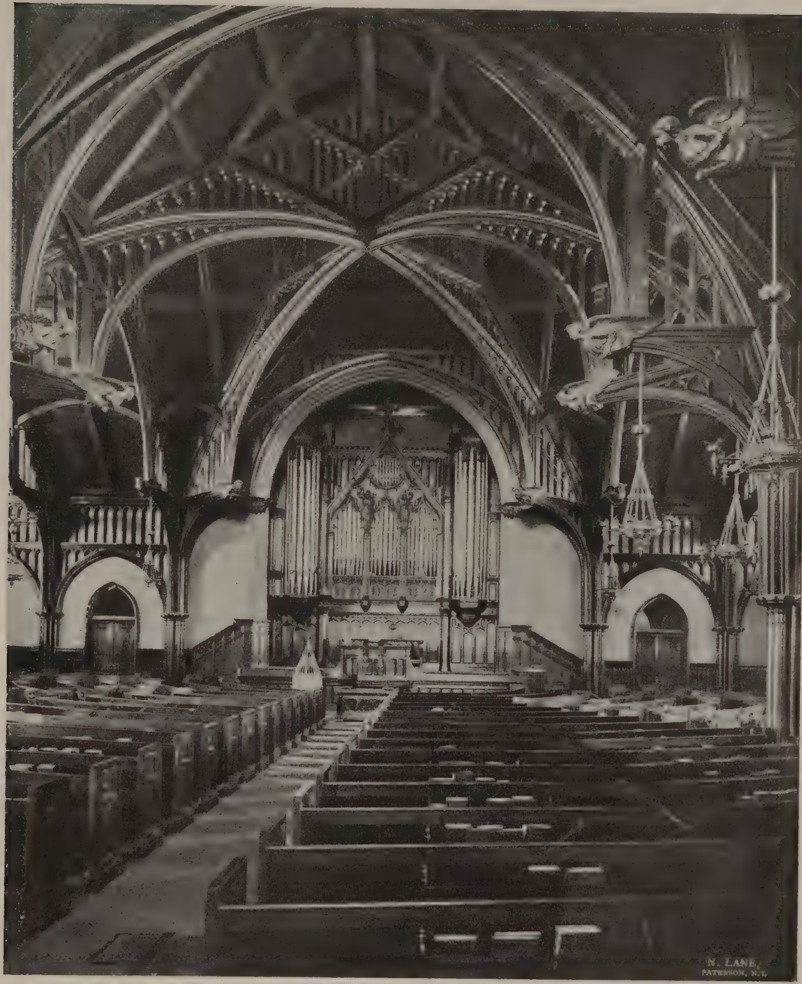
BOSTON
PUBLIC
LIBRARY

lighted from without, is also that of the Park Avenue Methodist church, in New York. The exterior, however, is not a satisfactory or intelligible exposition of the arrangement, the light, upon the visible side, being introduced through a clerestory arranged in a tiled and gabled superstructure in the plane of the aisle-wall, and the central compartment indicated only by a four-hipped roof, which is by no means a predominant feature. As an expression of the plan the arrangement cannot be called successful, although the exterior has interesting features, a very good west front, flanked by a plain campanile and the wall of the Sunday school room, crowned above the flat roof with a triplet of arches open to the sky, while at the centre is a picturesque projecting porch of two round arches, enlivened at the angles by gargoyles. The side shows a range of large lintelled openings in the wall of rough-faced brown stone, effectively framed between the tower at one end and the rectory at the other, and less effectively crowned by the gabled clerestory already mentioned. The interior, however, is impressive, and notably successful in the union in its expression of churchliness and homeliness, at which the designer evidently aimed.

The designer recurred to the essentials of this scheme many years later than the first essay, in the church of the Hampton Institute. Here, however, the scheme is so developed that the exterior is not in the least a compromise between the traditional church-form and the practical requirements, nor in any degree a mask, but a complete expression of the plan. Moreover the architects were enabled to carry out the project in a more durable material, the interior as well as the exterior, excepting the ceilings, being of solid masonry, and the building gets the benefit of this fact, as well as of the artistic advance that they had made in the interval. It is an extremely satisfactory piece of work. One may regret that the shaft of the campanile has been divided into stages, instead of being treated with the massiveness and simplicity that are so attractive in the tower of the Presbyterian hospital, and certainly the stages, especially the upper two, containing the belfry and the clock-face, respectively, are too nearly equal. But the treatment of the body of the building —the emergence and predominance of the central lantern, and the convergence upon it of all the subordinate parts of the composition—is admirably managed. The interior is equally expressive and equally impressive. Here, also, the superiority of the principal feature is emphasized, and the rest duly subordinated. The plainness of the interior is in itself very effective, and gives value to the ornament which has been so sparingly introduced. It is a very typical and a very successful modern Protestant church.

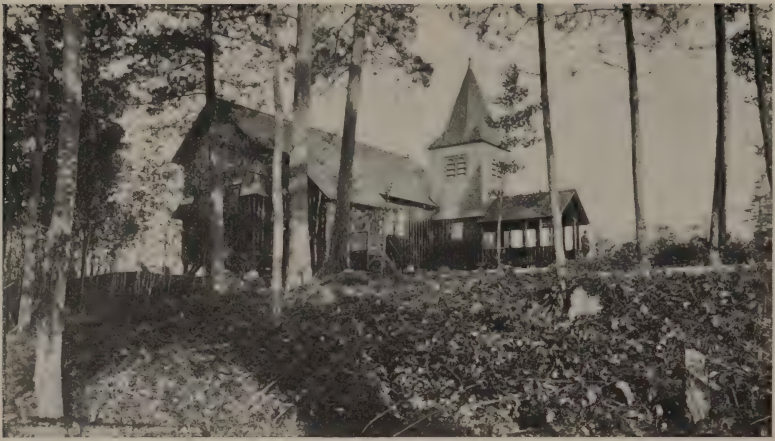
In a more conventional manner of church architecture, although it also is distinctly an auditorium, in the interior of the Church of the Redeemer at Paterson, and also, as the material allows and the illustration shows, of a much more elaborate development. In fact, it gives the impression of richness almost as strongly as the church at Hampton gives the impression of simplicity, and it is equally successful in its very different way. We have to allow the designer his timber arches at the crossing, liable as they are to the charge of "constructed decoration," and obvious as it is that their forms are not determined by their structural functions, in view of the grace and harmony of the result.

A series of suburban churches erected after the designs of our firm within the past decade are noteworthy in the architectural provision they have made for the social needs of a suburban or rural parish. The need is commonly answered, so far as it is answered at all, by a mechanical makeshift, often in the basement, if in a city, or otherwise in a dependency that is merely adjoined to the church and not architecturally incorporated with it. To make the assembly-room an integral part of the church is the effort that is evident in

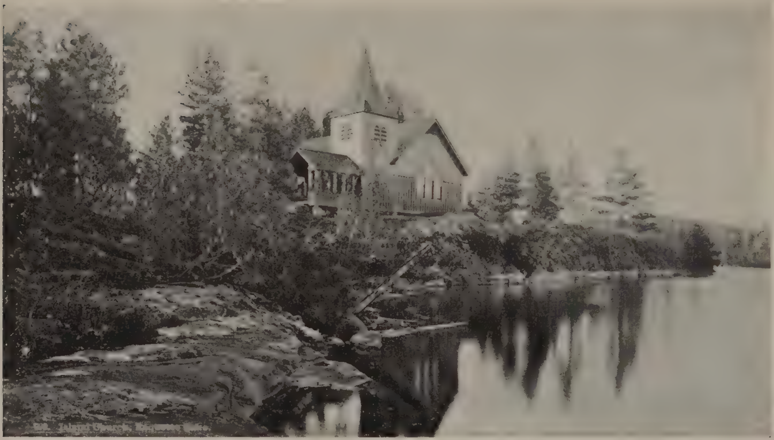


CHURCH OF THE REDEEMER Paterson, N. J.

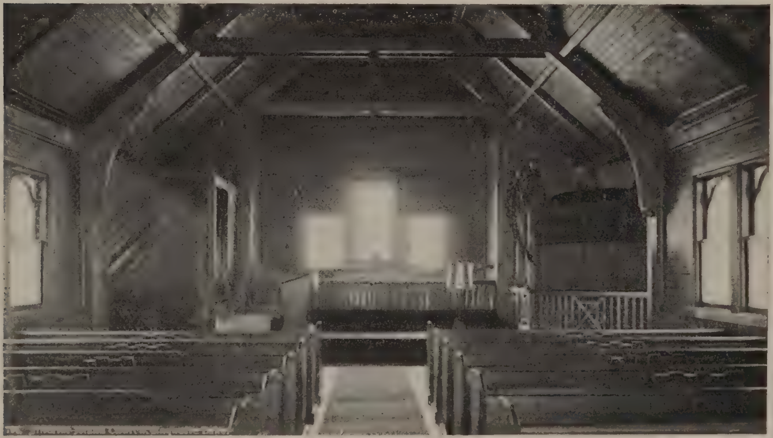
a series of interesting works of which the earliest is the Presbyterian church at Greenwich, and the latest the First Church of Morristown. In these an apsidal projection at the front answers the purpose of an assembly-room. It is separated from the church only by a light screen which is not a barrier, and is, on occasions, an addition of so much to its available space, while the illustrations show its value as a feature of the exterior. The church at Greenwich, with its central gable and apse, and its robust and simple tower flanked on one side by the lower transept and on the other by an umbrageous carriage porch, may be accepted as very nearly a model of an American Protestant country church. Its effectiveness does not depend upon ornament, for of elaborate ornament there is none at all. It comes simply from the careful study of the requirements and the successful pains that have been taken in the proportioning of the various members of the composition and their adjustment in relation to each other. There is not even enough of detail to designate the "style," though certainly it has style, and much of its charm comes from the



CHURCH IN THE ADIRONDACKS Racquette Lake, N. Y.

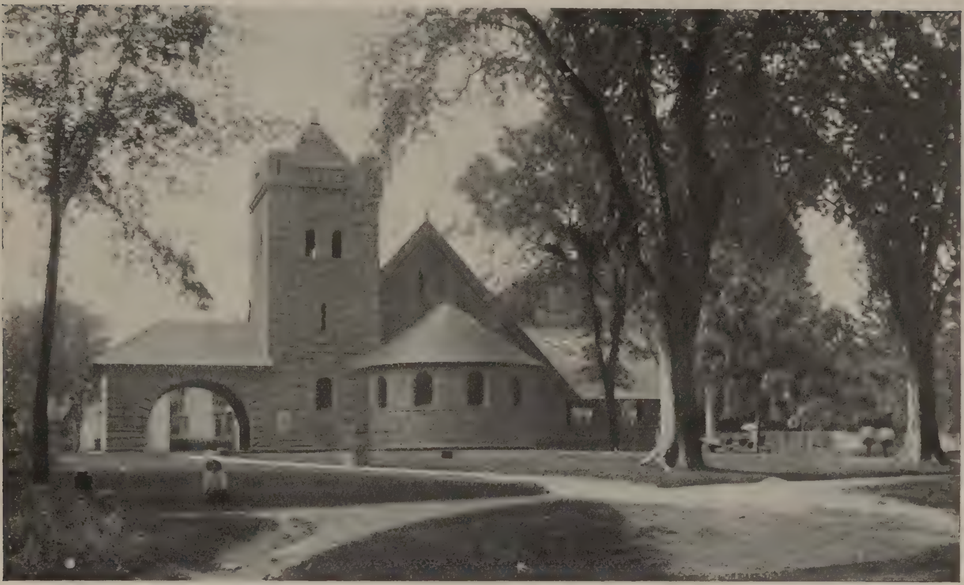


CHURCH IN THE ADIRONDACKS. Racquette Lake, N. Y.



CHURCH IN THE ADIRONDACKS. Racquette Lake, N. Y.

BOSTON PUBLIC LIBRARY



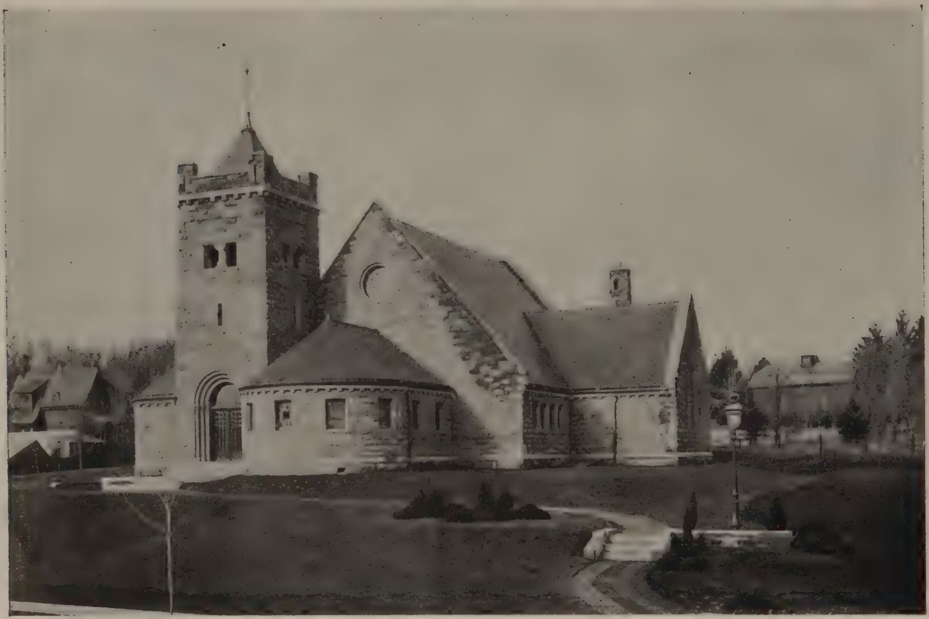
PRESBYTERIAN CHURCH Greenwich, Conn.

home-bred and vernacular air which is incompatible with a more scholastic design.

The Webb Memorial, in Madison, much resembles its predecessor, the assembly-room being an equally conspicuous feature, and the treatment of the tower similar. The modelling of the doorway, however, is carried far enough to designate it as an example of Romanesque, though evidently nothing was further from the designer's intention than to present an example of any style. The interior exhibits, in a general way, the arrangement with which we have already been familiarized. The central square is here doubled and the arrangement is not carried out in a clerestory, the interior depending for its light upon the openings in the outer walls. Executed as it is in a monochrome of rough brown sandstone, the building has a gracious and comfortable aspect that is extremely taking.

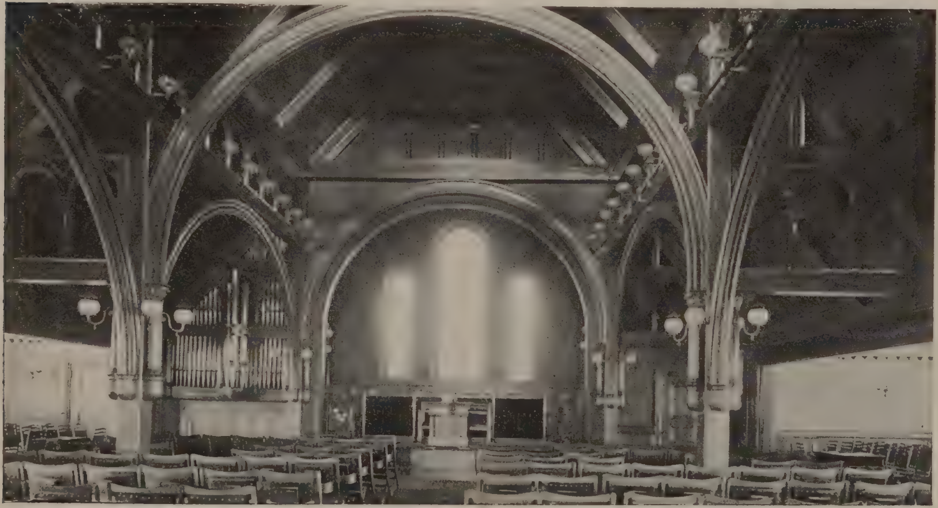
The latest of the series, the First Church at Morristown, is considerably the most ornate, and in expression considerably the most urban of the series. Compared with the others it makes a distinct impression of richness and elaboration, and is more ample in arrangement as well as in scale. The apsidal assembly room is more developed than in the preceding examples, and, instead of adjoining the tower, is detached from it by the length of an arcaded cloistral passage which enhances the effect of both features, while it has its own effective counterpart in the arcaded porch on the other side of the apse. A rather rich arch-frieze supports the cornice of the apse, while the tower, above its solid shaft, shows a tall and elaborated belfry stage, a great mullioned and traceried window in a recessed panel covering each face. The material is a light limestone, in which the wrought work shows to advantage, and which contrasts effectively with the varnished tile of the roof.

The interior also may almost be called splendid in contrast with the austerity of some of the earlier churches we have been considering. The nave is covered with a barrel-vault, decorated with cassettes, through which are cut the lunettes that serve as clerestory lights, and of which

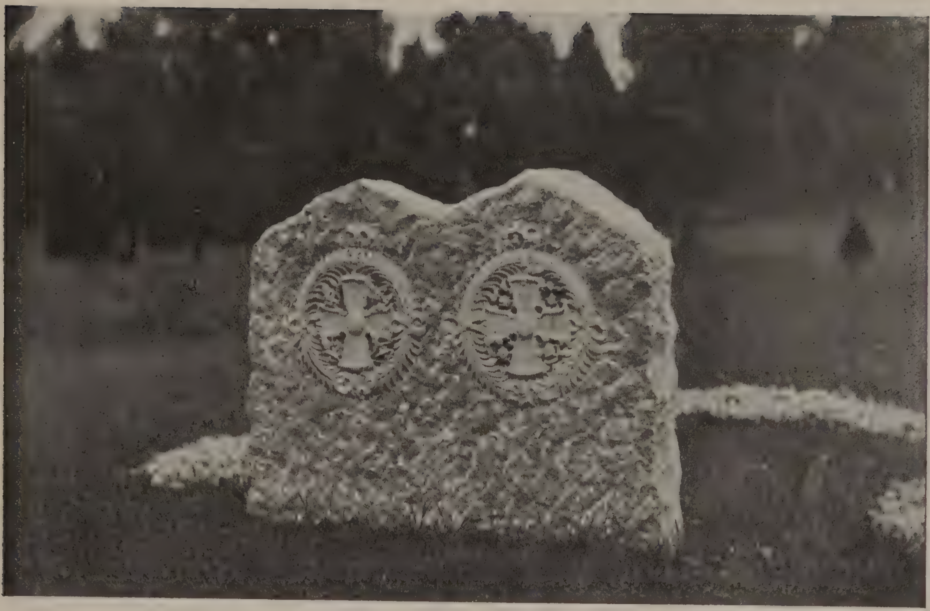


WEBB MEMORIAL CHURCH. Madison, N. J.

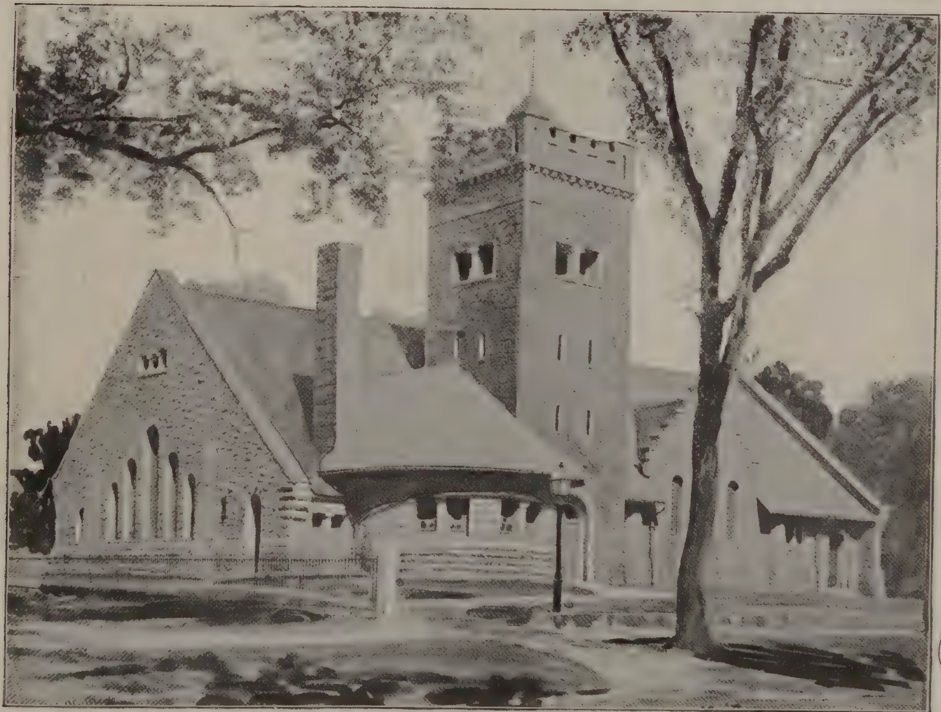
the protecting domes are effective exterior features. It is of three bays, carried upon columns and terminal piers of polished red granite, with carved capitals. It is a very effective interior, and a chief factor in its effectiveness is the open assembly room which, architecturally, is an integral part of it. The details and fittings have all evidently been thoroughly studied with reference to the ensemble to which they effectively contribute. The font, a plain polygonal pyramid of sumptuous Egyptian marble, is



INTERIOR WEBB MEMORIAL CHAPEL. Madison, N. J.

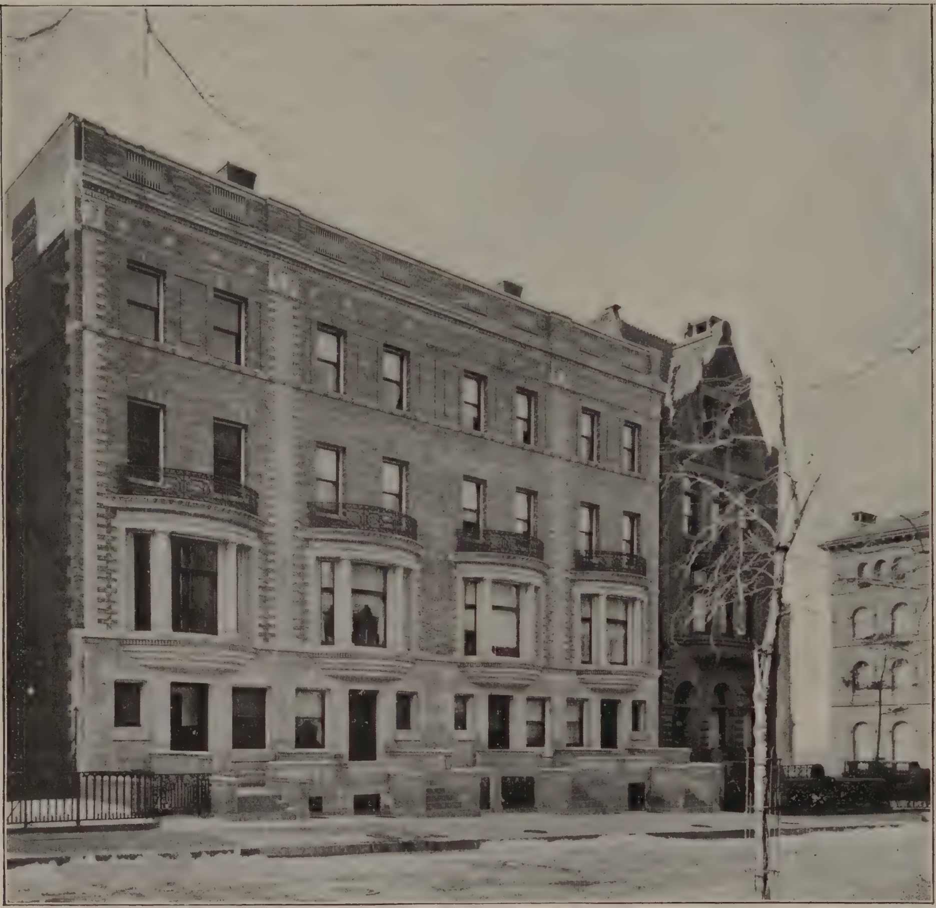


GRAVES OF TWO LITTLE SISTERS. Newburgh, N. Y.



CHURCH AND SUNDAY SCHOOL. Fairfield, Conn.

BOSTO
PUBL
LIBRAR

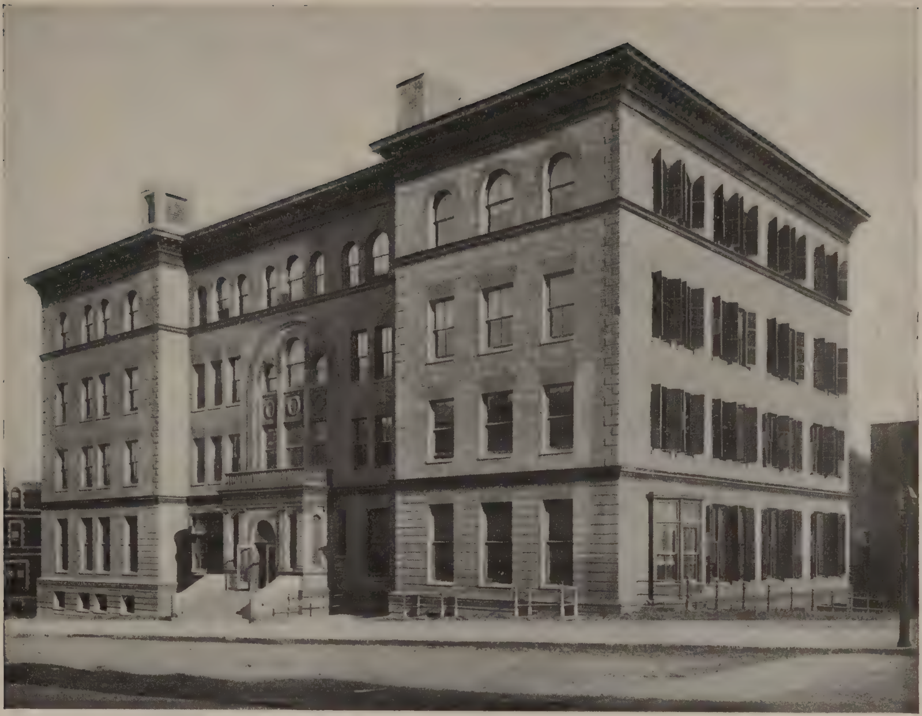


NOS. 8 TO 14 PIERREPONT STREET (1896). Brooklyn, N. Y.

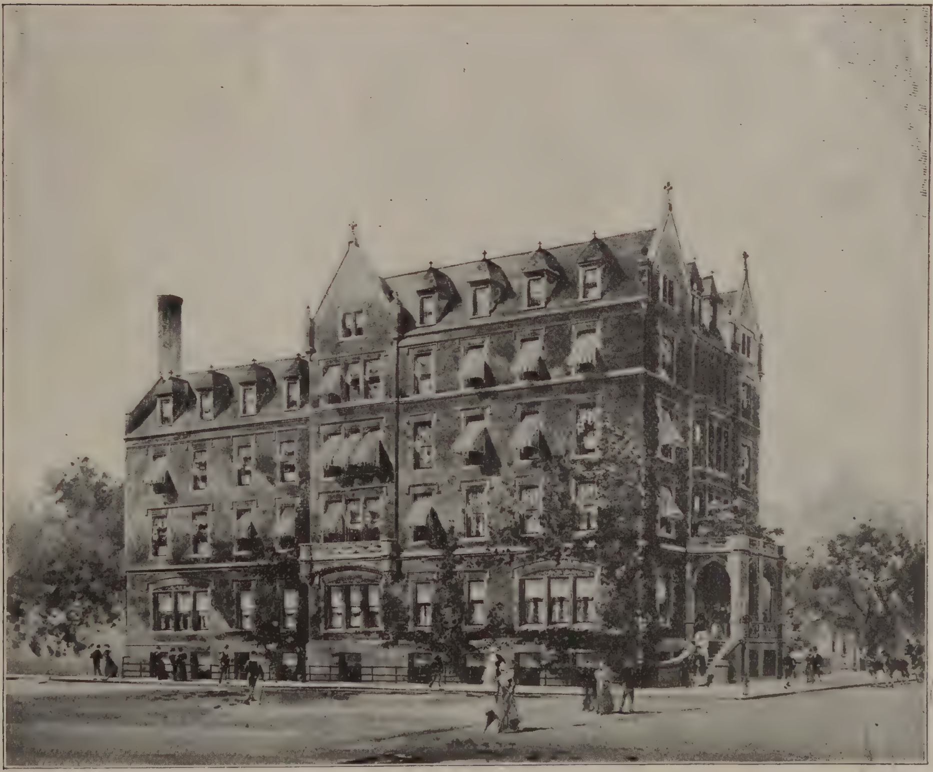
noteworthy among the interior details; but, indeed, all of them have an attractiveness which in the present condition of architectural practice is much less frequent than it ought to be. It is the attractiveness which comes from the sense that an architect has lived with his building and watched it grow under his hand and enjoyed his labor.

This series of churches appears to me, upon the whole, the most serious and successful of the work of our firm. Certainly no one who considers them can consider that architecture, in all its phases, is a matter of mere fashion and aimless fluctuation. No doubt that is true of a good many of the phases, and the work of almost any busy architect bears witness, more or less, to its truth. But a series of buildings like these churches, aiming seriously at the satisfaction of a real though not a merely physical requirement and at a worthy expression of their purpose, constitutes a worthy and exemplary work. When we contrast these dignified and civilizing edifices with the awful "meeting houses" of a generation and two generations ago, around which the young affections of the American villager were invited to twine, we must own that in some departments of architecture there has been progress, and that the progress is of high public importance.

Montgomery Schuyler.

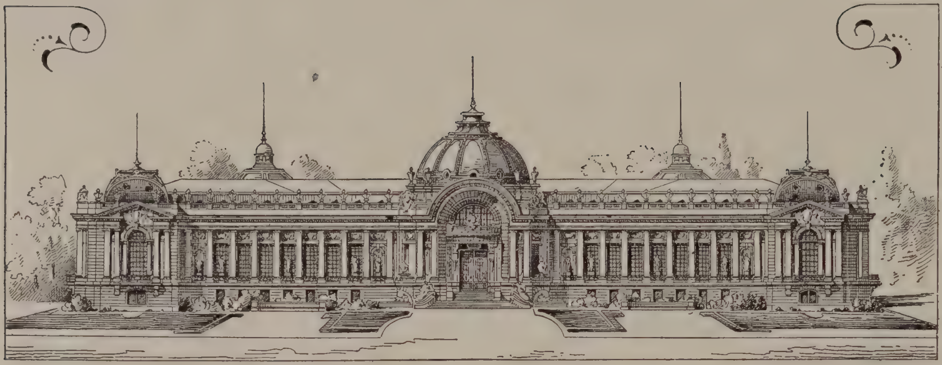


PROTESTANT HALF ORPHAN ASYLUM (1893).
Manhattan Ave., New York City.



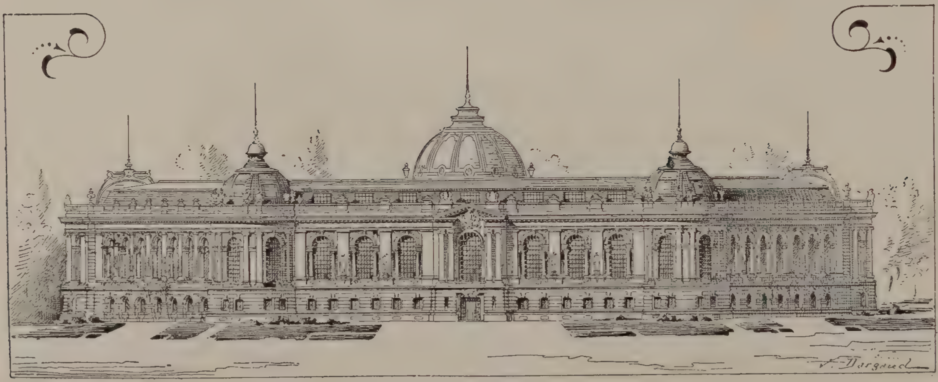
BOSTO
PUBL
LIBRAR

HOME FOR OLD MEN AND AGED COUPLES (1897).
Morningside Heights, New York City.



LE PETIT PALAIS DES BEAUX ART (Main Facade).

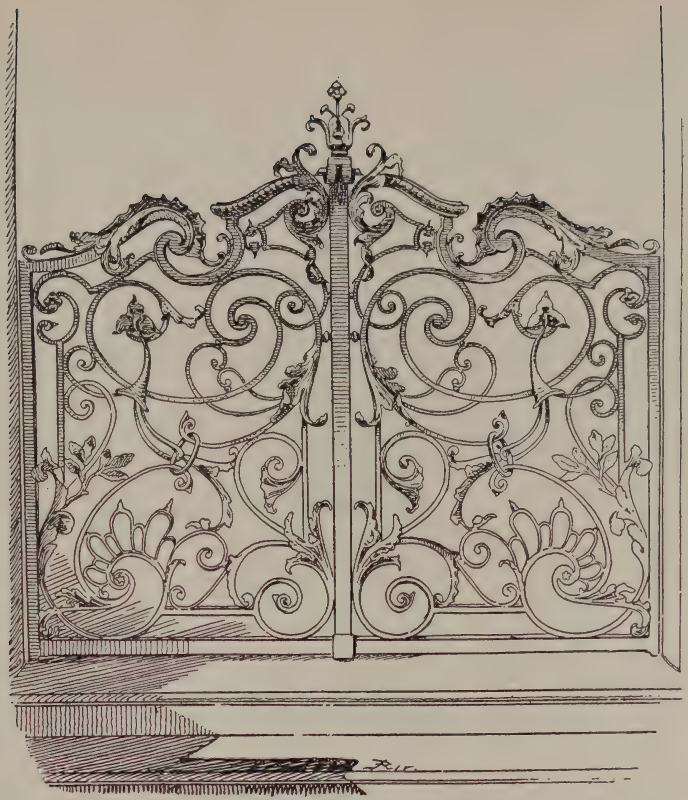
M. Girault, Architect. Design for the Paris Exhibition.



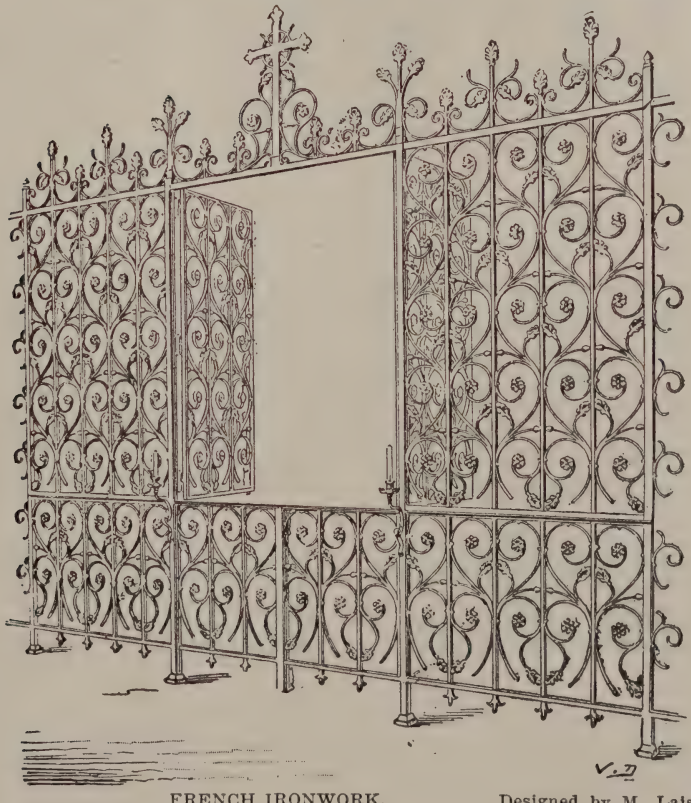
LE PETIT PALAIS DES BEAUX ART (Rear View).

M. Girault, Architect. Design for the Paris Exhibition.

BOSTON PUBLIC LIBRARY

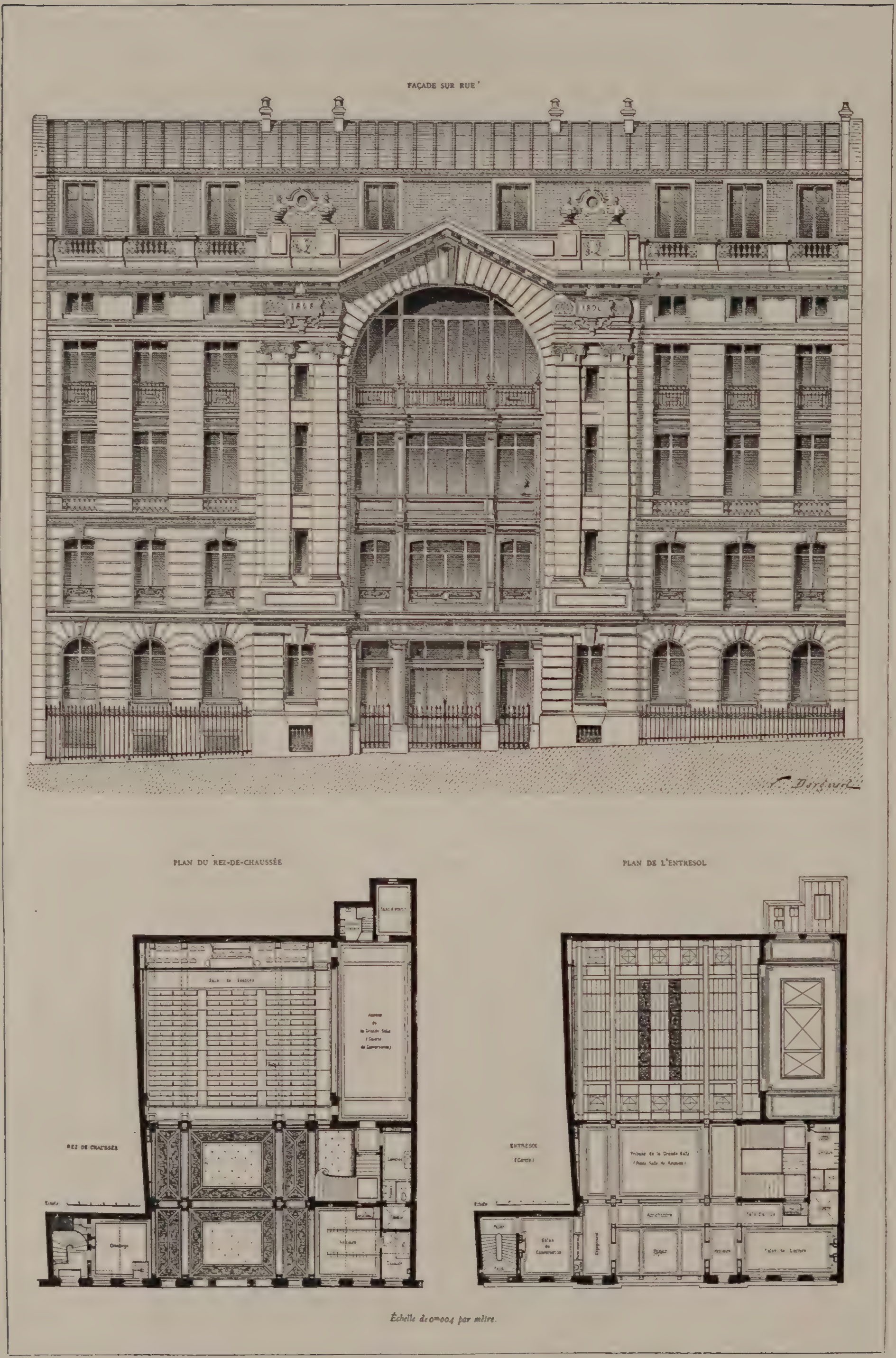


FRENCH IRONWORK. Designed by M. Ray.



FRENCH IRONWORK. Designed by M. Laisne.

BOSTON PUBLIC LIBRARY



NEW QUARTERS FOR LA SOCIETE DES INGENIEURS CIVILE.

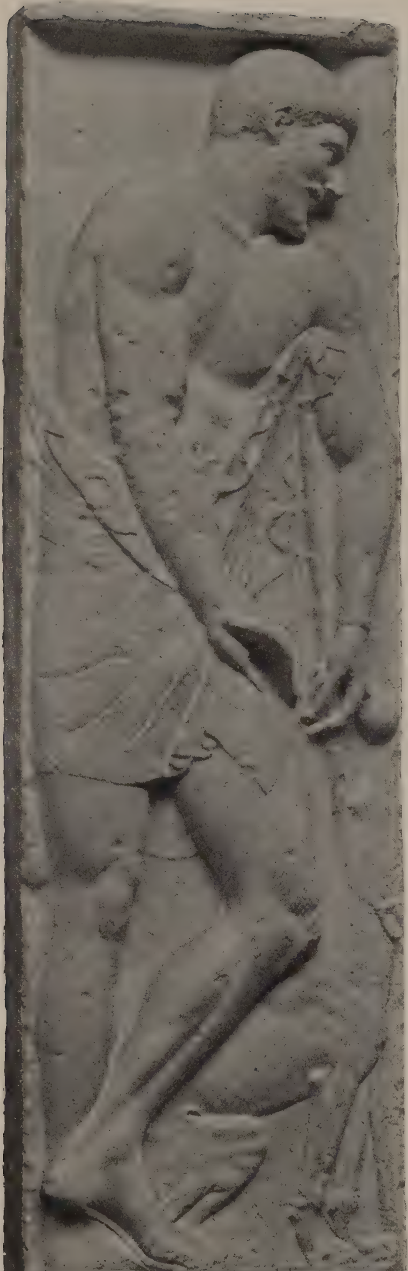
M. Delmas, Architect.

BOSTON PUBLIC LIBRARY

NEW BOOKS.

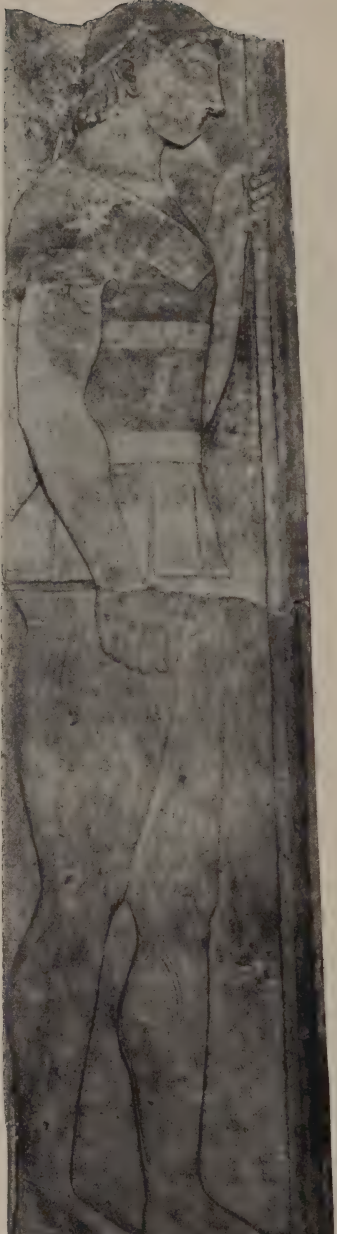
SCULPTURED TOMBS OF HELLAS.—By Percy Gardner, Litt. D., Lincoln and Merton Professor of Classical Archaeology and Art in the University of Oxford. With thirty Plates and eighty-seven Engravings in the text. London: Macmillan & Co., Ltd. New York: The Macmillan Co. 1896. Price, $8.00.

Prof. Gardner's theme is wider in its application than it may seem at first reading of the title page. The sculptured tomb may be primarily an object interesting for its sculpture, but, on the one hand, the general term includes many buildings whose architectural character is of universal and permanent interest, and, on the other hand, the significance of the sculptures is connected with the deepest and best teachings of the Greek masters of thought and with the instinctive beliefs of the Greek populations. On the one hand, we have to do with such monuments as the lofty structures of Hellenic Asia; on the other hand, the question as to the belief of the Greeks in a future life, as to ancestor worship, and as to the fear of ghosts, comes up and incidentally demands an examination and a comparison of theories. To speak very briefly of this latter and most difficult subject, let it be said that Chapters I., II. and III. deal with the Burial Customs, the Worship of the Dead, and the Belief as to Future Life among the Greeks. These chapters are illustrated by a number of photographic and other prints taken from vase paintings, mural paintings in tombs, and terra cotta reliefs. A curious analysis of a recorded painting by Polygnotus in the Lesche of Delphi, which analysis is expressly stated to be founded upon the work of a German archaeologist, Karl Robert, occupies a part of Chapter III., and is a curious instance of that tone of absolute certainty in the conjectural restoration of a lost work of art which grows upon archaeologists and which is, perhaps, partly traceable to the natural impatience of a writer who has to say continually "it appears," "it is probable," "apparently," "it seems to follow," and the like. Let it be allowed the critic to say, once for all, that the inferences drawn by modern students from an existing work of art, or still more, from a comparison of several, are respectable and important and are our main helps along the road of art study; but that reconstruction, based upon the words of ancient writers, are of a far different and vastly inferior value. The descriptions by even the most careful, classical writers of the works of art which they had seen, even these—for there are many more descriptions of works of art which they had only heard of—are descriptions written by men who knew nothing of the processes or of the purposes of the artist, and who avowedly describe the scenes represented rather than the artistic purpose of the designer. We have not from antiquity the writings of any man who seems to have understood fine art as artists understand it. These accounts have come down to us in MSS. of disputed authenticity, where words, and sometimes whole passages, are asserted to be interpolated, changed, or dropped: and yet our whole idea of what Polygnotus's art was like, is based upon these unsatisfactory, untrustworthy passages taken in comparison with the Greek sculptures which are thought to be of that period and which still remain to us. It is well to do what Prof. Robert has done and to do again what Prof. Gardner has done in rendering the German text by English paraphrase, but the words of positive assertion should all be replaced by careful and guarded phrases with a strong tone of "perhaps" and "probably" running through them. Think what is under-



STELE IN THE NATIONAL MUSEUM AT NAPLES.

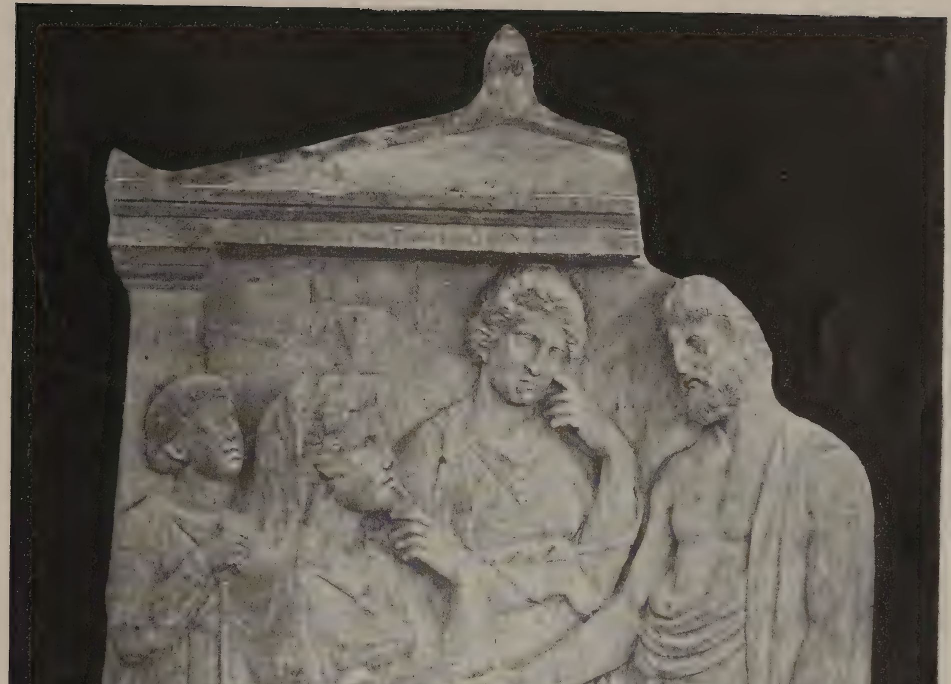
Closely resembling one given by Mr. Gardner in Plate IX.



STELE OF PRE-PHIDIAN TIME.

Given by Mr. Gardner in Plate IX. It was found in Velanideza, in Attica, called the "Soldier of Marathon," and kept for many years in the Theseion, at Athens. Now in the Central Museum there. Covered with painting, which has now mainly vanished.

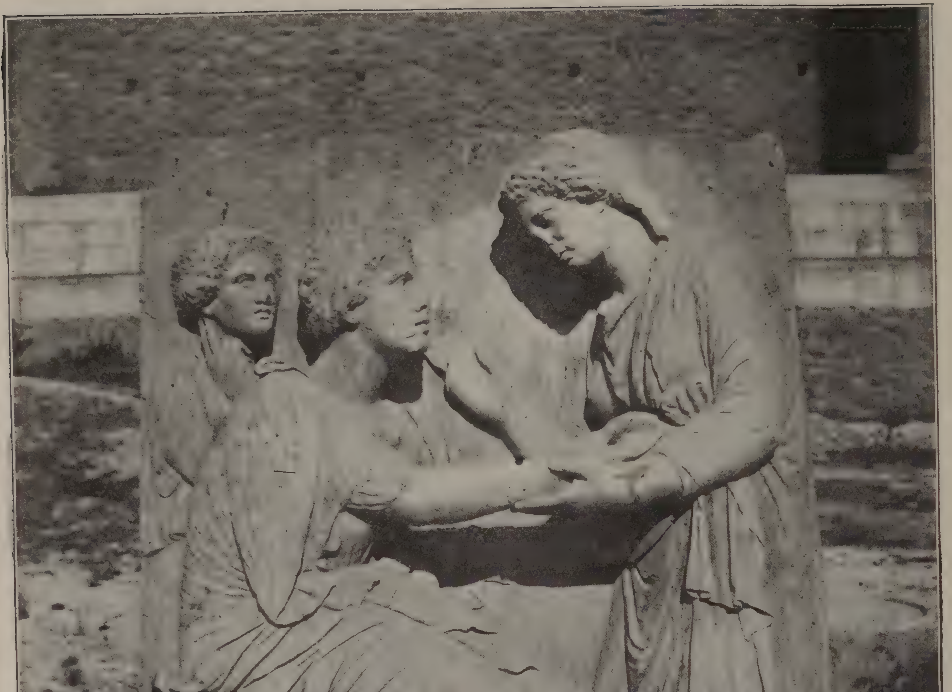
BOSTON
UBLIC



STELE OF DAMASISTRATE IN THE CENTRAL MUSEUM, ATHENS.

Given by Mr. Gardner, Plate XIII.

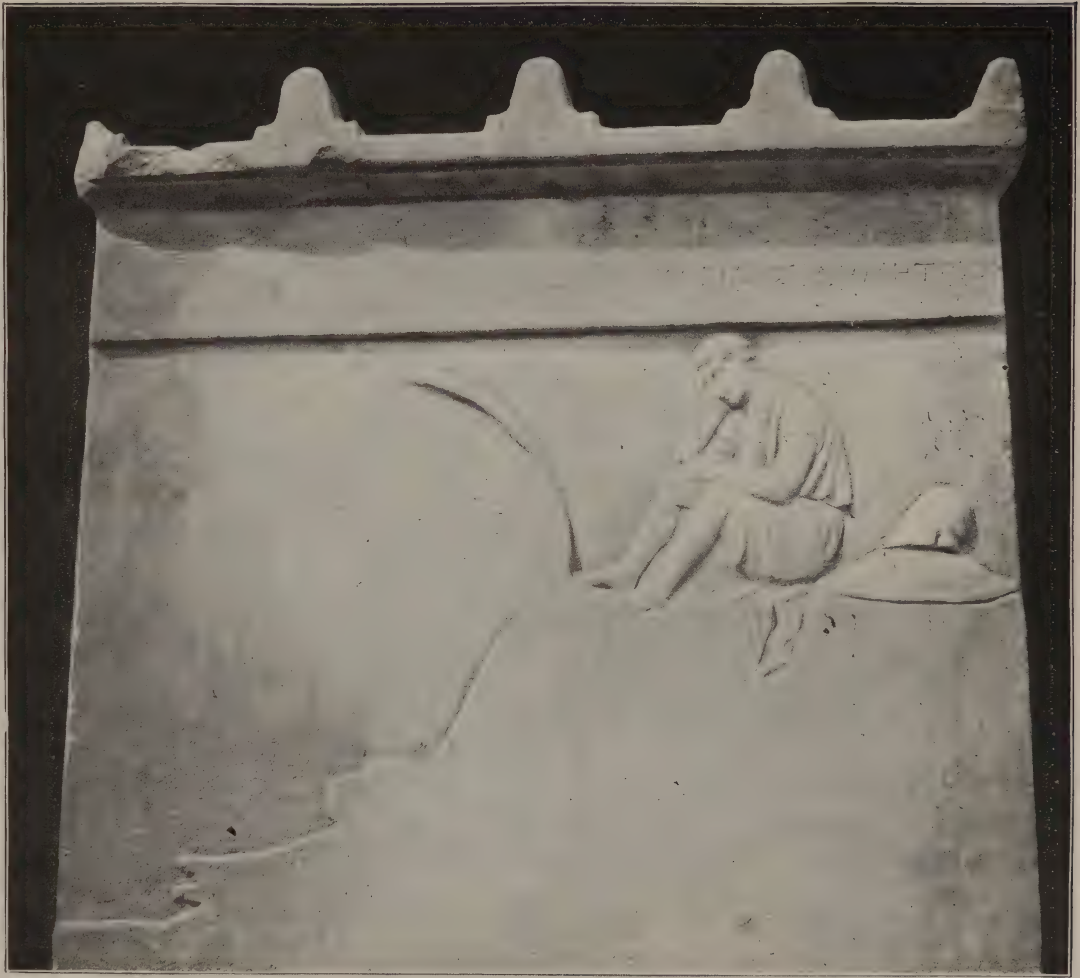
OSTON
BLI
AR



STELE IN THE CENTRAL MUSEUM, ATHENS.

Given by Mr. Gardner, Plate XXIV.

BOSTON PUBLIC LIBRARY



VERY SMALL STELE OF DEMOCLEIDES, IN THE CENTRAL MUSEUM AT ATHENS.

Given by Mr. Gardner, p. 153. The youth is seated on the prow of a galley, of which the details must have been given by painting.

BOSTON

heroic verse and the Greek hexameters into English ballad metre. Why is the student of art supposed to need Prof. Gardner's notions of how English rhyme can approximately render Greek verse? What the English student of art wants to know is the full significance of the Greek passages, of what the Greek writer meant to say. It is not alone in the Chapters which we are now considering that Prof. Gardner drives accuracy out of his renderings in order that they may rhyme. In Chapter III. we have this translation of the Odyssey IV., 560, viz:

"In Argos' horse-abounding plain
To die is not thy fate,
O Menelaus, there for thee
No mortal chances wait.
Thee shall the immortals far away
To earth's remotest end,
Where fair-haired Rhadamanthys dwells
In Plains Elysian send.
There life flows on in easy course,
There never snow nor rain
Nor winter tempests vex the land;
But Ocean sends amain
Fresh Zephyr breezes breathing shrill
To cool the untroubled life.
There dwell, since thou are kin to Zeus,
And Helen is thy wife."

It is not to confess one's self indifferent to poetry to say that this would be more accurately and even more agreeably rendered in the words of the Butcher and Lang translation, as follows:

> "But thou, Menalaus, son of Zeus, art not ordained to die and meet thy fate in Argos, the pasture-land of horses, but the deathless gods will convey thee to the Elisian plain and the world's end, where is Rhadamanthus of the fair hair, where life is easiest for men. No snow is there, nor yet great storm, nor any rain; but always ocean sendeth forth the breeze of the shrill West to blow cool on men; yea, for thou hast Helen to wife, and thereby they deem thee son of Zeus."

A good prose translation of a Greek poetical original has a better chance of being in itself poetical than a verse translation has, as is sufficiently shown by comparison of the above extracts. Prof. Gardner's verse is a remarkably literal rendering, for verse, but all poetical expression has been expelled from the passage by the effort to secure as well as fidelity rhyme and meter. The purpose of this criticism is to set forth the supreme importance of giving the prose meaning of the Greek so far as modern scholarship is able to effect it, and not to hinder that by the interposition of rhyming verse which necessarily distorts everything.

The final chapters, XIII., XIV. and XV. deal with the architectural monuments of Asia, which, as the author truly says, are of a much more elaborate and sumptuous character than anything in Greece, and with the recently discovered Greek sarcophagi found at Sidon and now in the Museum at Constantinople. These works, like the Greek relief monuments, have special books devoted to them, but these books are large, and of great comparative cost, and the summing up furnished by Prof. Gardner is of the very highest utility. In fact, what is to be said of this book, as a general criticism, is this, that it contains nearly all that the ordinary student needs to know concerning two or three very important phases of the great art of the Greeks. The wealth of the volume in photographic illustration is very considerable, and it affords, indeed, a small museum of architectural and decorative sculpture of a first-rate quality.

JEAN FRANCOIS MILLET; His Life and Letters. By Julia Cartwright (Mrs. Henry Ady), with nine Photogravures by the Swan Electric Engraving Co., and Messrs. Braun, Clement & Cie., of Paris. London: Swan, Sonnenschein & Co., Limd. New York: The Macmillan Company. 1896. $5.00.

The photogravures which illustrate this book are fairly successful. They are taken in an excellent way and probably nothing but their smal scale and the peculiar character of the works of art themselves prevents their being altogether satisfactory. It is necessary, however, to protest against the translation into English of some of the French titles, although one recognizes the occasional difficulty of doing this translation aright.

The book is, as the Preface states in modest and becoming terms, a collecting into one volume and a putting into English of books about the painter Millet, which books are generally in French. It is not, however, the work of a mere compiler. Mrs. Henry Ady is a practised writer on subjects connected with painting, and is known as the maker of books of excellent character; books which are a real addition to the constantly growing literature of painting. Millet's greatness is strongly felt and its nature well explained in these pages, and if its comparative importance in the vast world of graphic art is a little forced in the expression, it is an error that one may forgive. The same tendency is visible everywhere among persons who care for Millet; there is no artist who inspires greater enthusiasm or a more unmeasured admiration even as his pictures are compared with the greatest paintings of the past.

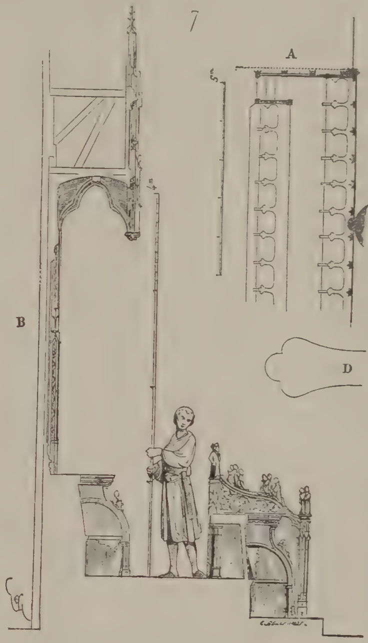
The simple existence as of a French peasant without pretensions beyond the peasant life which Millet led for years is, also, very well explained. A great number of the artist's letters are printed and these help at once to a better understanding than would otherwise be possible, of his humble, country life and of his feelings and his ambition as a painter. The translations of these letters seem to be very accurate. Those which the writer has compared with the originals in Sensier's book leave nothing to be desired in the way of fidelity to the originals.

In short, this book contains in excellent form all that one needs to possess for the proper understanding of Millet's life; or all, at least, except his work itself, as much as may be obtainable.

CHOIR STALLS AND THEIR CARVINGS. —Examples of Misericords from English Cathedrals and Churches, sketched by Emma Phipson, author of "Animal Lore of Shakespeare's Time." With an Introduction and Descriptive Notes. London: B. T. Batsford, 94 High Holborn. 1896.

The choir of a church is that part which is given over to the clergy and the choristers, that is to say, to those who conduct the services, much of which in a large establishment will be choral. Choirstalls are those fixed seats with corresponding divisions, backs, and canopies which are arranged on either side of such choir. There are not necessarily more than three or four on a side; and, indeed, in late churches, small and unimportant seats, three or four in number, are put anywhere in the choir. But in a great Cathedral they are, of course, very numerous; perhaps, sixty on either side and arranged in two rows, those in front, or facing one another across the width of the open floor of the choir being raised one step above the floor, the others raised two steps higher still. Our illustration, taken from Viollet-le-Duc's "Dictionaire," Vol. VIII., p. 469, shows in section the arrangement of the unequalled stalls of the Cathedral of Amiens, which were begun and completed between 1508 and 1522. Now, in this figure, the division between each pair of stalls is finished at top with an elbow rest, shown on a large scale at "D," the projecting front of which is called the cluseau, and is itself the recipient of delicate sculpture in cases where the stalls are rich. The misericord, which we call also miserere, and sometimes, as our authoress reminds us, sellette, is the hinged seat, which in our figure is shown as lowered in the upper stall and raised in the lower one. Now, when this miserere was lowered, the chorister sat upon it as upon a chair; but, during the very numerous occasions for singing or chanting a part of the service, the miserere could be raised, and then, resting upon the back of the stall, offered its projecting boss as a sort of half prop, half seat, from which the chorister could get some support while his elbows rested upon the division above. The name misericord, of course, implies the pity embodied by this unrecognized but admitted quasi-seat.

The bosses on the under side of these adjustable seats, which bosses are misericords, properly so called, received a great deal of rich and fantastic carving even in churches where the rest of the stall was not so elaborately adorned. Miss Phipson points out how effective a row of these carved bosses must have been when, the stalls being empty, and the seats raised, the carvings showed in long rows all of the same size and general disposition, but all differing in their fantastic leafage and iconography. Her book gives what appear to be complete lists of the misericords in one church after another;—Loncoln Cathedral, Ely Cathedral, Soham Church, Beverley Minster, All Souls' College at Oxford, and many others. To each list is appended a certain number of illustrations. Thus, in the case of Exeter Cathedral, of which the stalls are stated to be the earliest remaining (in England, presumably), the list is of twenty-eight stalls on the north side and twenty-one on the south, and fifteen drawings are given on five plates. The plates generally give three figures each, and these, we are told, are all rendered on the same scale. They represent all epochs, from the early XIII.-century examples of Exeter to the elaborate ones in King's College, Cambridge,



Cathedral of Amiens.
Section through the choir stalls, from Viollet-le-Duc.

more than two hundred years later, and which have a look as of Italian sculpture of the XV century.

The wholly unique figure sculpture of the Gothic period, abounding in characterization and extreme vigor of action and movement, often at the expense of plastic beauty, is, of course, better studied in the stone sculpture of the great porches and their concomitants when one can be sure that it has not been restored into meaningless monotony. There are finer things at Chartres in the porches than any woodwork can offer; that much is certain. But in England especially the stone carvings have been cruelly misused, not merely by being scraped and shaped and "surfaced," but in the setting up of modern figures made in the closest possible imitation of the ancient ones, so that time and investigation are needed to convince one of the authenticity of the partly denaturalized ancient pieces that remain. The wooden carvings of the stalls are free from this criticism. Just as the study of Greek coins is recommended to all students of sculpture because they, at least, are the genuine and unaltered design of the Greek artists, while the museum statue is generally a third-hand Roman copy, so mediaeval spirit remains in the minute and often roughly-finished oak carvings where stone sculpture has lost its virtue. Let us print here Miss Phipson's description of one of the misericords of New College, Oxford. "Three men. The one in the centre is unarmed, in both senses, and wears his hair long; he is clad in a tight-fitting tunic and pointed shoes, as are the others, with very droll effect. The man on his right (A) has in his uplifted right arm a dagger; the man on his left (B) grasps the hilt of a sword merely, the broken blade lies on the ground; with his left hand he makes a gesture of despair. D, a man with two-handed sword advancing against (A), S, a man, nude, but for a short cloak and a peaked cap, his back turned to the spectator, throws back a Roman-looking sword to strike (B)." A representation of that brilliant composition is given in Plate 60, Fig. 2. Of course, there are few of these little ornamental masses which contain so many separate figures engaged in so elaborate action; the subject is more apt to be a mermaid in the middle with two dogs or lions for the side pieces, or two birds for the middle with leafage for the side supports. In one extraordinary case, the central mass is a shield-shaped escutcheon, carrying the impaled arms of Courtenay and of the See of Canterbury, as Miss Phipson explains. This is from the Church of All Saints, Maidstone, and the text informs us that De Courtenay obtained the King's license to convert the Parish Church of St. Mary into a collegiate church, and that he gave it its new name of All Saints in 1395.

The question now arises about the value of the drawings, and a word has to be said here to remind those practised draughtsmen who still, in these photographic days, are accustomed to make architectural drawings for their own use and benefit, that if it had been necessary for them to express the full significance of a piece of delicate sculpture, so that all who looked at the drawing would understand it, as they might understand a photograph, a different touch would become necessary from that which they use for their free memorandum. The present writer has drawn hundreds of capitals and bosses in his time, and is practically convinced that there is but one way of doing it, and that is to take the point of a pencil, or, under more favorable circumstances, the small brush, and work with what the free and vigorous artist of the studio would call a "niggling" touch, working up each little nook and corner of graduated shade as it is spread before him, until, little by little, a semblance of the original appears upon the paper. In some such way Miss Phipson has done her work. In no one of the cases before us has it been practicable to compare the drawing with the photograph of the original. Indeed, it may be said that photographs in detail of English architecture and architectural fittings and appurtenances do not exist; at least, they cannot be bought in the market; nor does any work exist, perhaps, in which they are given with any freedom. It can only be said that these drawings have the appearance of such verity as would be possible to painstaking work done in the right way by not very skilful draughtsmen. Probably Jules Jacquemart might have surpassed these in accuracy, as many a practised draughtsman could have surpassed them in other qualities. He above other men had the faculty of rendering the exact amount of imperfection or archaism in a piece of sculpture. There is always in the case of a very able artist the danger that he will insensibly deviate from the barbaric freedom of the original, and, as he corrects the anatomy, will destroy the design; Jacquemart is named here because he, almost alone among very able artists, knew how to give the exact amount of Chinese character to a jade carving, and of medieval character to an ivory statuette. The great Viollet-le-Duc, of course, could not be trusted for a moment; he knew the secret of making explanatory drawings, drawings that would tell the reader of his book exactly what it was that he had to insist upon, but accuracy was not in him. Accuracy is in all probability what Miss Phipson has aimed at and has attained, so far as it is attainable by a not very skilful hand.

We have to regret a certain use of words in the title in rather too universal a sense. This book does not deal with "Choir Stalls and Their Carvings," but with misericords alone, and it is limited to England. All of this appears, of course, in the subordinate or second title, but it is the primary title by which the book will generally be known. The volume closes with three indices; first, an alphabetical list of subjects, and second, an alphabetical list arranged under the towns which themselves are in alphabetical order; and third, a chronological list in which the stalls are arranged in the order of their dates, as far as these can be ascertained. The book is a convenient and tasteful quarto, in which one hundred plates are bound, with a text of 120 pages.

THE ARCHITECTURE OF THE RENAISSANCE IN ITALY.—A General View for the use of Students and Others. By William J. Anderson, Architect, Associate of the Royal Institute of British Architects, Director of Architecture and Lecturer at the Glasgow School of Art. With Fifty-four Collotype and other Plates and Seventy-four smaller illustrations in the text. London: B. T. Batsford, 94 High Holborn. 1896.

This book announces itself as being the substance of five lectures which were delivered at Glasgow. It is a brief treatise made into a volume by the insertion of many illustrations and analytical heads of Chapters. The point of view is that of the admirer of the Renaissance architecture and the admirer, also, within limits and with drawbacks, of the architecture of the Decadence; or, at least, of the first years of the Decadence as far as the beginning of that barocco style which the author seems to condemn altogether. The critical spirit is strong throughout the work and is evidently an enlightened one. The author's study of the buildings which he discusses has been minute and extensive, as is shown by those pages in which a lengthy comparison is maintained between buildings which may be supposed to have exerted an influence and buildings which seem to have received the influence in question. The remarks made in the way of general historical description are judicious and show independence of thought.

One of the best instances of that comparative analysis which has been commented upon above is the account given of Baldassare Peruzzi, Sanmicheli and Sansovino, in Chapter V. It is, for instance, a thing worth noting, the influence exercised by Peruzzi over the work of Sansovino as noted by the author. In the same Chapter the analyses of the palaces at Verona, by Peruzzi, and of the Venetian palaces by Sansovino, are capable of teaching much of the secret of the later Renaissance to students who will follow these passages of the text carefully, with good photographs before them. It may be that the later Renaissance has received a more careful and more extended treatment than the early epoch, but this may seem so rather because of the disproportionate attention given to the early Florentine work by other writers. It is, moreover, to be observed that in so brief a treatise, one of two alternatives must be chosen; either the description of all the buildings must be very brief and cursory, or the description of a few and the comparison between them may be carried out with care and at considerable length to the exclusion of other parts of the subject. That the author is at perfect liberty to choose between the two alternatives, no one has a right to deny. Moreover, it is certain that the choice which the author has made, of treating more fully that which he considers more important and letting the rest go with brief notice, tends to make by far the more readable and, on the whole, more instructive book. Synopsis or essay: between the two no one would hesitate as to which his choice would be, although the synopsis, of course, has its place in the curriculum of the school.

It is to be noted, though not to be insisted on too strongly, that the author's use of the English language is not free from fault. "Peruzzi's mouldings . . . indicate a superior knowledge of the antique than is evinced by the work of his contemporaries," (p. 108): "Such buildings as the Palazzi Strozzi or Grimani are unique and have no relation of an imitative kind to anything in classical times." These are the only examples that need be given of a careless wording rather common in these pages. This, however, is but a trifle and does not in any way injure the value of the work to the student. That which is to be greatly regretted is the inferiority of the illustrations; the more so, as the writer says expressly in his preface, that he leans upon his illustrations greatly and that pains had been taken to illustrate the subject thoroughly. The half tone prints are very indistinct; the small ones and large ones alike certainly very inferior to the worst which any number of this magazine contains. The collotype plates, of which there are nearly fifty, are proportionally inadequate, not comparing for a moment with the work which similar books published in Paris during the last ten years contain in great abundance. On the other hand, it is a pleasure to find a number of measured drawings by the author carefully and well reproduced, and the plates made by copying these drawings are alone worth the cost of the book to any serious student. As an instance of what is meant, Plate XI., opposite page 32, is devoted to the Church San Salvatore del Monte, near Florence. Plates XXIX., XXX., XXXI and XXXIII., all at page 86, are devoted to the entrance vestibule of the Palazzo Massimi, at Rome, and text illustrations on page 87 and page 88, complete what is really a valuable monograph, which monograph is further elucidated by the collotypes in Plate XXXII. In like manner Plates XXXVIII., XXXIX. and XL., between pages 106 and 109, contain measured drawings of the Palazzo Albergati, at Bologna; one of its general elevation and two of details. These drawings of the author's are evidently altogether trustworthy and it is hard to imagine anything more useful to the student. Their value is enhanced by the photographic illustrations, unsatisfactory as are these last, and by the explanatory text.

DIE ARCHITEKTURFORMEN des Klassischen Alterthums mit besonderer beruecksichtigung der Saeulenordnung und Gesimsbildung herausgegeben mit unterstuetzung des Herzogl. Braunschweigisch-Lueneburgischen Staats-Ministeriums von Constantin Uhde, Professor an der Herzogl. Technischen Hochschule zu Braunschweig. Berlin und New York: Bruno Hessling.

(The Architectural Forms of Classical Antiquity, with special reference to the columns and entablatures of the orders, published with the encouragement of the Ducal Government of Brunswick-Luneburg. By Constantin Uhde, Professor at the Ducal Technical School of Brunswick.) Folio; pp. 8; 70 engraved plates.

This useful book furnishes the student with a great number of comparative measured drawings of Greek and Roman orders, many plates of sections through bases and cornices and the like, and many examples of decorated mouldings and details of capitals, key-stones and carved friezes. It is not the first of its class by many. The advantage that it has is that it is the latest of its class, and as such, in all probability, the best. The standard set up for such books of selections is constantly raised, and if any one now borrows from his predecessors, he must do so with a thoroughness and accuracy, and with an evident utility of purpose, which will seem to warrant his dressing himself in their feathers. The greater part of the figures given in these plates are ascribed directly to the works from which they are taken. Thus, the sections of Doric capitals on Plate X. are set down as being taken from Hittorff and Zanth and from Serradifalco and those on Plate XI. are from Professor Newton, Blouet and Cockerell, respectively, and those on Plate XII. are from Penrose and Pennethorne. In like manner the Doric columns which are given in figured elevation in the Plates from XV. to XXII. are ascribed to the different authors named above, respectively, and to such other authorities as Wilkins, Texier and Pullan (a doubtful authority), Dellagardette, Durm, Stuart and Revett, and Adler. A list of the works from which the figures in these plates are selected is given at the close of the German pages of the text. There are some odd errors in it, due, probably, to careless proof-reading, but they are not likely to lead one far astray.

We have, then, a work which pretends to no originality except in matters of treatment, and even in the matter of treatment the work is less thoroughly done than, perhaps, we have a right to expect. Thus, in the unlucky reference of the Temple at Assos to Texier and Pullan, above mentioned, it would have been easy for the compiler to have referred to that publication of the American Archaeological Institute which treats the Temple at Assos with close reference to what it really was, and without the fantastic inaccuracies of Texier's book. Why, moreover, is the English publication referred to instead of Texier's original French work on Asia Minor? That book was, indeed, as full of errors as it was possible for a large and costly book to be, but these errors were carefully reproduced in the English reproduction which Mr. Pullan had to do with, and it is the French book, and not the English one, which is generally cited in all archaeological writings.

We have seen already in the few sentences given above what are the probable merits and the probable defects of a work of this class. Everything depends upon the accuracy of the plates selected for reproduction. Nearly all the writers named above are to be trusted, exception being made for those slips into which even an accurate student and draughtsman may fall when he is making up the order of a ruined temple by the measurements of its fallen parts. Still, if a real reconstruction of an ancient buiding is what interests the student, he must, of course, beware of plates like these, and must, of course, ascertain whether the original authority is to be trusted implicitly. Thus, when there is question of decorative building and the painted representation of decorative building at Pompeii and the authorities given are Niccolini, Zahn, Mazois and Chabat, it becomes the student to ascertain the relative value of these authorities. In like manner, when one of the earlier Italian buildings, the Temple at Cori, is taken from Lampue, and the Temple of Fortuna Virilis, at Rome, is in part, at least, referred to Canina, one has to remember that Lampue is very trustworthy from the point of view of a student of the Paris school occupied in making careful drawings which are to form part of the permanent archives of the school, while Canina is as untrustworthy as it is possible for a so-called archaeologist to be. And this brings up another and a curious question. When the author tells us that the authorities for this plate for the Temple of Fortuna Virilis are Canina, Castro, Taylor and Cresy, and photographs, what are we to assume? It would not be hard, indeed, to compare the plates given by the three authors named with such photographs as can be bought anywhere of that well-known little building, but really it is not important that one should do so. What one desires to know is the way in which Professor Uhde has made up his plate. Has he taken Canina's pretty figure and altered it to conform to Castro, or has a skillful draughtsman altered it to correspond to the photograph? It is as certain as anything can be that all these four authorities do not agree exactly. A similar puzzle arises on the same page with regard to the Temple of Aphrodite at Aphrodisias, in Asia Minor. This plate is ascribed to Texier and Pullan and to the work on Ionian antiquities of the English Dilettanti Society, and it would be good practice for a student who feels himself curious in the matter, to compare at the Avery Library the plate of that building given in each of the two books cited. On Plate XXXVI., the Temple of Vesta at Tivoli is represented by a specimen of its order, and this is fathered upon no less than five different authors, besides the photographs. The reader, perhaps, sees now why the present writer has not undertaken to verify all these figures. In that collection of six different sources from which truth concerning the Temple of Vesta may be drawn, there is a first rate, a second rate and several third rate authorities, and if it should be found that this plate is made up from one with touches of another, it would become a very interesting piece of mental gymnastics, indeed, well worthy the attention of the youthful archaeologist.

So much by way of allusion to the errors, perhaps natural shortcomings, of such a work. It is made up critically, as one would expect to find it; but while the student who takes his measurements without inquiry from these pages may be led into some errors, he will certainly be led to the gaining of much useful knowledge and will find himself enriched with a kind of familiarity with the monuments of antiquity which it will be hard for him to get as easily elsewhere. Plate LXIV. is, for instance, of really extraordinary value, and the inaccuracies that may exist in it will be found to be of no consequence whatever. It gives thirty-nine different figures of the systems of as many different Greek and Roman buildings, from the Temple at Assos to the Temple of Mars Ultor. All these are drawn to the same scale and the peculiarity of the columnar architecture of the ancients, namely, that the proportions were generally maintained the same in the smallest as in the largest buildings, is laid before the student with striking force when he sees the diminutive order of the Athenian Temple of Nike Apteros (Fig. 19) compared with the gigantic Temple of Zeus at Girgenti, or with the Temple of Mars Ultor, whose altitude is even greater than that of the more ancient structure. So the figures of the arcuated buildings given on Plate LXV., on the same scale, three triumphal arches and three theatres or amphitheatres, are equally important to the student. It cannot be too much insisted upon that one should study buildings with relation to their scale. Even the undoubted truth that classical architects proposed to themselves the same proportion of their order in large and small buildings alike, cannot do away with the importance of this question of size. In Plate LXIV., the student will see that the wide span of the intercolumniation in the Temple at Girgenti exists only because it is an assumed intercolumination, because the columns are only make believe columns, having been built with the wall; and in the huge Roman temple, which vies with the Sicilian one in size, and which was really columnar in construction, he will see that the intercolumination never exceeds the narrowest proportion usual in such cases. The immensely wide proportional stretch of the lintels in Fig. 31, the colonnade of the Forum at Pompeii, could never be carried proportionally into the large scale of the Roman monuments given in the last line of figures, and any attempt to do this, as in the Paris Madeleine, is shown by this example to be an error which has no classical authority. These niceties of classical building and the apparent sense of what was feasible and what it was not best to attempt, should be studied by those who wish to take their revived classical architecture from other than merely academic sources. The pages of Vignola are not everything, and neither are the exact proportions of any one monument everything. A novel interest might be given the columnar style, now so much in fashion, if those who decide to build in that style would study it a little more in detail as its originators used it. To a certain extent the orders were plastic in the hands of the Grecian and Roman builders: and some thought given now to the limits within which these builders allowed themselves to play with their style would certainly be an inspiration worth going for to the original sources, or in default of that, to such reproductions as those contained in this book.

There is one plate devoted to the architecture of Egypt taken from the well-known book published by the French Government, and that almost equally well known, by Lepsius. There is also one plate of Assyrian architecture and ornament taken from the works of Layard and Place. There is also one of ancient Persian architecture and one of Egyptian ornament compared with Grecian painted mouldings, apparently with the view of showing the probable derivation of the European from the earlier style. This being done with, the rest of the work is devoted to the Greek and Roman orders, as explained already. There is a text of brief mention and description of the different monuments, and this is furnished both in German and in English. The book is one for every architectural student to own, if possible; but, also, one which he should consult with precaution, and allowing always for possible errors.

THE CULTS OF THE GREEK STATES. By Lewis Richard Farnell, M. A., Fellow and Tutor of Exeter College, Oxford. In three volumes, with illustrations. Oxford: Clarendon Press. New York: Macmillan & Co. Vol. I., 1896, pp. XX., 423; Vol. II., 1896, pp. 425 to 761.

This is a book which requires notice here merely in its capacity as a treatise on Greek sculpture. Nearly half of it is devoted to "Monuments of the Cult of" and "Ideal Types of" this divinity and that. The great importance of this subject in all our future studies in classical sculpture is evident, because the world of archaeology is at the threshhold of a very great advance in all of its methods of study as applied to Greek and Greco-Roman iconography. It may be that Mr. Farnell does not quite see how very important is a patient and sagacious agnosticism in the matter of attribution; it may be that he accepts somewhat too readily the generally admitted types of the greater divinities of the Grecian mythology; and yet his book will aid very greatly the progress of more accurate knowledge. Until we realize that we are not certain that every figure of a mature and bearded man is a Zeus or a Poseidon, we shall not be in quite the position which we should assume in studying the expressional side of Greek sculpture. Already much has been gained in the knowledge that has been acquired concerning the statues of men in the bloom of youth. It is much to know that these are not always Apollos and that those which are not images of Apollo are not necessarily images of Hermes. It is much to know that some of them at least were tomb-statues or idealized representations of men, and that there is a very great difficulty in separating the human form from the divine images. It must be repeated that our author seems a little too ready to accept the Apollo-attribution and the Zeus-attribution in the cases of well-known works of ancient art, but if a thorough study is given to these types, the encouraging and stimulating tone of his book will have the effect of aiding students whose reading is mainly in English books, toward that fuller sense of the meaning of Greek sculpture which the future has in store for us.

To illustrate this point by the most difficult case of all, the representation of Zeus by the Greeks of the Great Time, it will be well to take the treatment on page 126 ff., in which the figure on the Parthenon frieze, the first southward from the central group of priestess, priest, and attendants, is assumed to be that of Zeus. This attribution is, undoubtedly, the common one. The figure has been called, also, Hephaistos, and Hades, but there is a general concensus of opinion that the first in apparent place of honor of one of the great groups of divinities, is Zeus, and that his next neighbor is Hera. The photographic picture of this supposed Zeus (b., plate III.) is accompanied by another (a., plate III.) taken from an outline lithographic print in the Archaeologische Zeitung, which representation, in no way convincing as to its probable accuracy, is taken from a bas-relief at Bologna which itself is of doubtful antiquity. Immediately following these two representations comes a reproduction of another print taken from the well-known series of engravings of the Theseion frieze; but these drawings are not archaeologically accurate, and the sculptures have been seriously injured since they were made, besides having been greatly defaced at an earlier time, so that the inference drawn from the seated figure shown in Plate IV., which, as the author says, "appears to be moving in his seat through the lively emotion which the combat caused in him," is a little doubtful as a starting point for any elaborate chain of reasoning. Now, everything depends upon what the author is trying to show. So far as he wishes to show that it became, during the Pheidian epoch the custom to represent Zeus with the body and arms nude, or with the drapery thrown over one shoulder and one arm only, while the drapery concealed the person up to the hips, or even to the waist, and that, moreover, the custom was general to represent the god as seated, he is probably on safe ground, especially when we consider the documentary evidence we have concerning the enthroned statues of Zeus which have perished. Our author, however, draws some conclusions, also, from the features and expression of the Zeus in the slight lithographic drawing of the Bologna bas-relief, and it is worthy of notice that this is the only head which he finds, possibly, of the Pheidian epoch, from which he can draw any conclusions at all: for the fairly well preserved figure on the Parthenon frieze is more defaced about the head than elsewhere, and the figure on the Theseion frieze has lost its head altogether. In Plate IV. there is given a photograph of the well-known bust called the Zeus of Otricoli. In Plate V. there is a very singular head known as the Zeus of the Hermitage, and on pages 134 and 138 the facial expression of these heads is considered, and some attempt is made to compare the intellectual character of these two heads with the earlier types. All this is extremely dangerous ground for the archaeologist to tread upon. He has to assume, first, that the heads in question all stood for Zeus in the sculptor's mind and in the minds of those who admired his work; then, he has to fix the dates in an arbitrary way, no doubt with considerable probability, but still he has to fix the dates, which are not capable of being absolutely ascertained; then he has to explain by means of an admittedly Roman copy, the intellectual character, first, of the Greek original, and, secondly, of the type which the Greek original undertook to represent, because there is always room for dispute in the exact significance of even an expressive countenance in sculpture or in painting, and the attempts of historians to add to our knowledge of sovereigns and statesmen by means of a physiognomical study of even their admittedly authentic portraits are quite bewildering, and many would think wholly without value. Reference is made on page 117 to the bas-relief found in the Peiraeus and now in the National Museum at Athens, which bas relief is given in the photograph in Plate II.; and here an inscription of unquestioned authenticity records the dedication of the work to Zeus Meilichios (the Gracious or the Protector). Another, and somewhat similar bas-relief, is described in the text. Another votive relief, also at Athens, bears a dedication to Zeus Philios (the Patron of Friendship). These works of art are small and unimportant, the handiwork of low-grade stone cutters, but they imitate the original work of great sculptors, or, at least, follow types which have been established by artists of great standing. In these representations the enthronement of Zeus and the general character of his attitude as seated upon the throne, the holding of the sceptre in the left hand, the placing of the right hand upon the right thigh, the representation in profile with the side of the figure toward the spectator, or the torso slightly turned so as to show the breast to the spectator, all these are points worthy of note, and they are undeniable. Moreover, it would be easy to bring many such works of art into court as evidence for the gradual change of the attitude and the characteristics of the head itself, as more or less bearded and more or less adorned with curling and flowing hair. The text, with the foot-notes, as containing an interesting analysis of the cult monuments of Zeus (Chapter V.), and the ideal type of Zeus (Chapter VI.), is extremely well worthy of study, but the reader has to remember that there are some conclusions which are safe, and others which are of a most doubtful character.

The examination of the ideal types of Hera and their treatment in Chapter IX. give us further instances of this truth. Plate VIII. offers a large photographic picture of the "Farnese Juno," and Plate XII. a similar view, but in profile, of the "Ludovisi Juno." Of both these heads it is only to be said that they represent dignified and stately women, one of them having the stephane-fillet. Mr. Farnell reasons in favor of the Farnese bust being a Hera, but points out that Dr. Furtwaengler calls it an Artemis; and it might equally well be any ideal portrait of a maid or matron, human or divine. So of the Ludovisi bust. Mr. Farnell points out that it is part of a colossal statue and not a bust in the ordinary sense; and that Dr. Furtwaengler thinks it "a Roman lady of the Claudian period idealized as a goddess." In neither of these two heads is there any single attribute, or mark of any kind, which can in the slightest degree certify the intention of the sculptor to make a Hera out of his bust. On the other hand, the Metope from Selinus (Plate IX. a) and the vase painting (IX. b) have for their subjects in all reasonable probability Zeus and Hera, and the most interesting fragment shown in Plate X., in which a part of the "Judgment of Paris" is represented, gives us a womanly figure, which, undoubtedly one of the three goddesses, would almost certainly be a figure of Hera. Here, however, we have only a feeble outline drawing to represent the original; and one should really compare other outline drawings with photographs of the original object to realize how far astray a presumably honest draughtsman may go. In the figure before us, the garments, the flying veil, the wreath, the necklace, and even the arrangement of the hair, may, perhaps, be assumed to be correct, but it is wholly unsafe to reason about the face or to state on the authority of Plate X. that "the expression of her face is very profound and there is a searching gaze in her eyes that are fixed on Paris."

What must be insisted on is that it is nothing whatever to the scholar of the present day that writers have agreed for sixty or seventy years past that a given statue or relief represents a given personage. It is the business of the modern writer to re-examine all the testimony and not allow himself to be prejudiced in the slightest degree by the fact that catalogues call one head a divinity and another a Roman lady. The opinions advanced by competent writers, with their reasons for holding them, are, of course, to be carefully considered, and their value weighed; but the mere nomenclature of the custodians, accepted at once by the literary world, is not to be considered as of any value whatever. The "Venus of Milo" may be an Aphrodite or a Victory or another personage, and there are arguments enough already in print for each of several attributions. The fact that she is generally called the "Venus of Milo" is neither here nor there in the discussion.

The final results will probably be that students of religious beliefs and of divine personality will resort rather to the vase paintings, leaving all but a few of the great monuments of sculpture to the purely artistic study to which they lend themselves without opportunity of error. In the meantime, every such book as this addressed to an English reading audience is to be welcomed as introducing to a community which knows too little of the subject, the thorough, exhaustive, and fruitful, although frequently fantastic, studies of the Continental scholars.

DIE BAUKUNST FRANKREICHS (The Architecture of France), von Cornelius Gurlitt. Dresden: J. Bleyl. 1896. MOTIVE DER MITTELALTERLICHEN BAUKUNST IN DEUTSCHLAND (Motives of Mediaeval Architecture in Germany), von Hugo Hartung.

The two works named above, of each of which one part has come to hand, are the latest additions to the growing library of truly modern architectural books. These are they which have photographic processes of one kind or another for their very life, and without which they would never have had existence. These are they which Germany, especially, excels in, and seems almost to have introduced. These are the books which are biblia abiblia, or books not books, in a sense very different from that in which the words were used by Charles Lamb. For how can you call that a book which consists of 300 large plates and only a dozen or two dozen pages of text, the text itself stuffed so full of plans and details and diagrams that there is little room for letterpress? These are the publications which are making the enthusiastic buyer of architectural photographs hesitate, and ask himself whether he does not get what he requires in better form and at less expense by buying these extensive series.

All persons who consult modern books on the fine arts are acquainted with the superb work in heliogravure and similar modern styles of photographic engraving which is done in Paris. It is so far unmatched, this French work of the best sort. Still it is Germany in which the largest use has been made of these modern labor-saving and most accurate processes, in the direction in which we are looking to-day. There have been works in folio illustrated by photographic processes in full page plates, so numerous during the last ten years, that we will not give the list here, but try to make one, more or less complete, at an early date; and these have been issued by two or three German publishers, the attention of the compilers having been given to somewhat unusual subjects. Thus, Spain and Portugal, the German Renaissance, and what is very unfamiliar to the Continental student, English architecture, have been the subjects of important books of this class. In the meantime, the architecture of that country of Europe where architecture is the most rich and the most varied, has been generally neglected, and it is only now that a book begins to appear which has for its object the buildings of France. Moreover, German architecture itself has been treated only in certain specified ways along certain lines laid down in advance.

There is one important reason why a relative superiority is to be claimed for the large plates which make up such works as these; a superiority over the ordinary photographs of the dealers, and that is the great probability that the subjects selected and the points of view chosen will be determined by purely artistic or scholarly reasons. No one having photographs made to his own order, or trying to get together many photographs illustrating a given subject, or a given territory, can have failed to note the extremely unintelligent way in which the great majority of photographers do their work. It is, of course, to be stated at once, and always borne in mind, that the photographer who is making pictures, one by one, for sale to he knows not whom, is badly handicapped by the necessity of finding his market, and that it is almost inconceivable that he should have a clear mind as to what his purpose is. Such a photographer will be thinking always of the general public and hoping that this or that picture, although, as he believes, fit to please the student of architecture, will also appeal to the larger public of tourists. He works under a disadvantage, therefore. Those makers of photographs who think of the traveling public only, and whose notion of rendering a great cathedral in a photograph consists in giving it from three of the best known points of view, have, indeed, no afterthought. The west front of Notre Dame, the apse of Notre Dame taken from across the river, and the whole cathedral as it shows above the houses when taken from the top of the Pantheon or from the Tour St. Jacques, these are subjects that appeal to the general public, and which, there can be no doubt, will sell. But when the would-be artistic photographer tries to please more studious buyers, he is naturaly at a loss what points of view to consult and what details to offer. Only those patriotic Provincials who live close under the shadow of a great building, and who make that building their specialty; or, who, living in a town where there are several important buildings, like to make a collection, as it were, of their native place, are to be trusted at all in such cases. Thus, Ricci, at Ravenna, has taken, one might say, everything in the little town, and thus, Trompette, at Rheims, took advantage of the scaffolding which some repairs to the Cathedral made necessary, and traveled over the church with his camera, taking these details at the rate of several hundred in one season. There are thus exceptions to the rule, but the rule remains, and every student of architecture who has tried to procure photographs at those European towns which are the richest in architectural monuments, knows how slow and difficult it is to gather from the booksellers and stationery dealers of the place even a dozen poor, faded, and unintelligently-made photographs of what he most desires. For France, indeed, the great collection of the Commission des Monuments Historiques makes amends, and the existence of such an establishment as Giraudon's, in Paris, helps to a great extent to bring together what photographs are to be had of French monuments. It is hard to supply one's self adequately in France, but it is partly feasible. One does not get all that he wishes, but he gets much. With Germany, however, things are different, and it has been, and probably still is, almost impossible to procure more than a few photographs of the monuments of any piece of architecture seen. It is probable that these few, in any given case, are trivial; that they are pictures taken on a very small scale, and from a considerable distance, and intended merely to sell to the Rhine tourists, or the visitors to Saxon-Switzerland. The student in Germany will remember the cases where, in out-of-the-way towns, he has found two or three photographs of monuments of that town, or, perhaps, of its near neighbor, taken by some photographer long since dead, or at the command of a local society of archaeologists long since dissolved, while no later pictures are to be had, and none whatever of buildings that are to him equally important. Every such student has had to decide between employing some local operator, or taking his own photographs, or going without, and if he has wished to employ the local photographer, he has probably found it extremely difficult to get the workman in question to leave his workshop for a day, or for two or three afternoons, and to undertake any such task as that of making a dozen negatives. Germany always seems to be that country of all the nations of the continent where satisfactory pictures of the national architecture are the hardest to come by.

These, then, are the reasons why we should welcome especially the two works whose titles stand at the head of this review. Mr. Gurlitt's selection of French buildings; the points of view which he selects, and the details which he considers important, are to be preferred, other things being equal, to the selections of the local photographers, and as to the vast collection of the government commission above named, all that can be said is that these pictures are in addition to what that collection affords, and are also to be welcomed. Almost the first photograph that offers itself as one opens the portfolio is the upper part of the south tower of Tours Cathedral, one of the most beautiful Renaissance towers of a charming Gothic Cathedral, which towers are unique in Europe and yet are little known. An admirable view of the interior of St. Julien at Tours, differs in the parts selected for the picture from other photographs which have long been familiar. A very remarkable interior view of the extraordinary fortified Cathedral at Albi, and one of the interior of St. Pierre, at Angouleme, should be extremely welcome to the student, and a most successful photograph of the Roman gateway at Besancon, called the Porte Noire, will be to many the most attractive picture in Part I. For those who are studying the later revived classic, that of the eighteenth century, there is to be recommended the view of the Hotel de Ville, at Dijon. There is here only the first part, containing twenty-five photographs and no text at all; and the photographs are probably chosen so as to give the possible purchaser a fair idea of what the whole work will contain. It will be seen that it ranges over all epochs, from the second century to the eighteenth century.

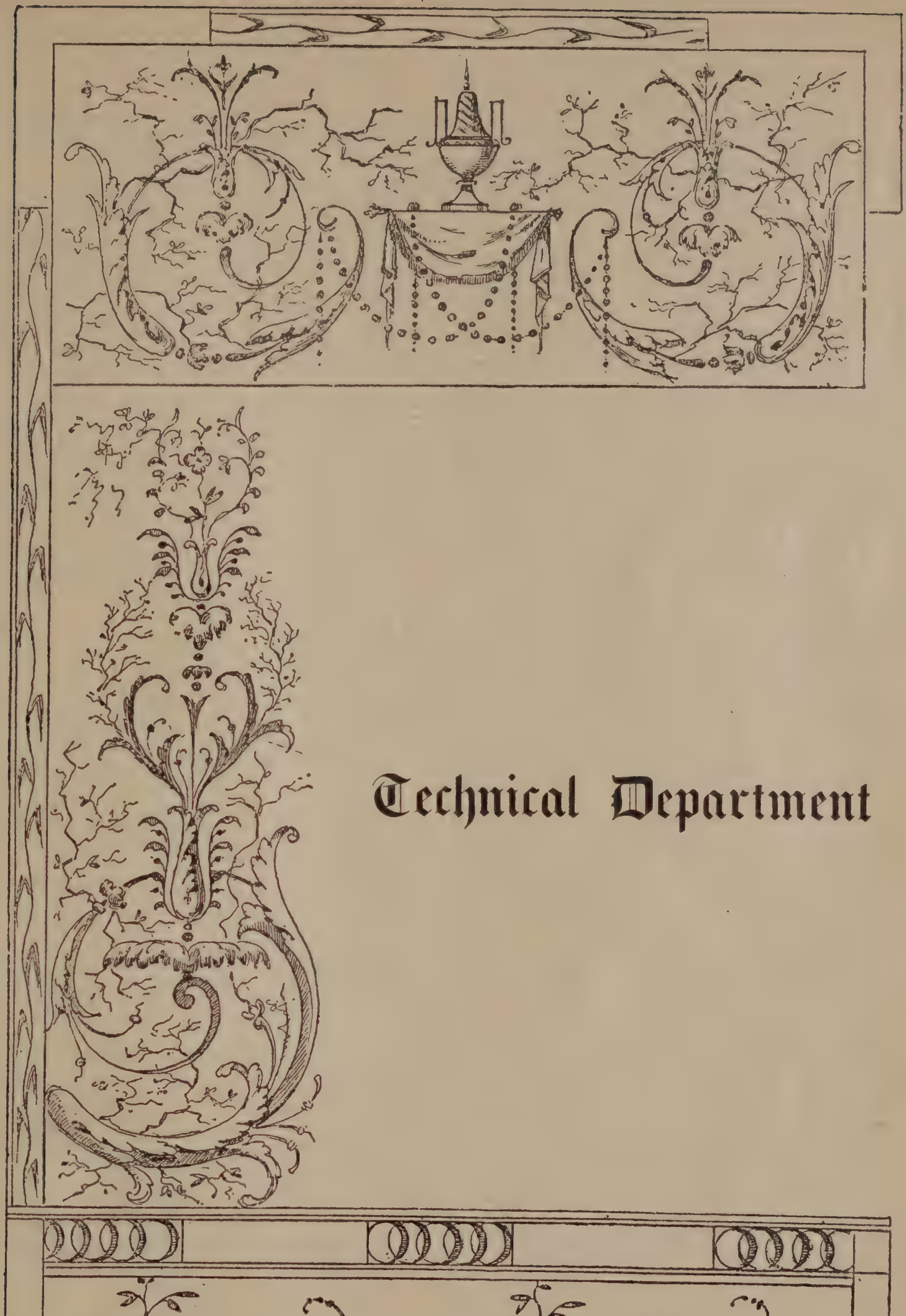
For reasons above given we consider Hartung's Germany more of an acquisition than the book we have been describing. It is unspeakable, the number of big books that one would have to turn over to find engraved plates or even inadequate wood-cuts of one-half of the monuments given here; while these are excellent photographs of the "Lichtdruck" variety. This first part contains what may be considered a monograph on Magdeburg Cathedral; seven plates devoted to the more out of the way, the less familiar parts of that most interesting structure, which would like to be Gothic if it had only been able to find a way of being Gothic without being French. This, in the thirteenth century, it was practicably impossible to bring about, and a wealth of naive clumsiness was the result; so that those who like Gothic architecture pure and simple, concentrated and in full vigor, will get more comfort out of the extremely interesting view of the upper gallery which runs around the choir and is one of the most fascinating pieces of transition vaulting in Europe, or from the surprising and original chapel of the Baptistery than from the main nave or choir. Buildings far less familiar than Magdeburg Cathedral, which all books tell about, are given here, and given with some fullness. It is, indeed, especially to be remarked, the willingness of our compiler to go far afield and select seldom-visited buildings in small towns which the guide-books scarcely recognize. Koenigslutter, near Brunswick, in what is now, thanks to conquest, a province of Prussia, is a diminutive place, which few travelers hear of, and the splendid monastery-church which is nearly all that remains of the ancient Benedictine Abbey, is one of the most fascinating pieces of developed and perfected German Romanesque in existence. It has been elaborately restored within, and the interior has been painted with some remarkably appropriate details, but the parts not so renovated will engage the student's interest the most, and to such students is to be recommended especially Plate XLI., with the irresistible cloister of two rows of vaulting and a middle range of columns. The flank of the Cathedral of Halberstadt is extremely valuable, offering as it does a complete flying-buttress system of perfectly understood and completely organized type, but obviously very early. The apse of the Conventual Church at Goslar, shown within and without in Plates XLV. and XLVI., is as complete a piece of the earliest Romanesque design as one will find this side of Syria. It is, indeed, curious to see how closely the exterior resembles the exteriors of some of those wonderful apses of the Hauran, which the Conte de Vogue has made familiar to the students of Europe. Some plates are given up to details, doorways and piers with carved capitals. Indeed, we are reminded by this that the title of the work is not German building or German architecture, but the motives of German architecture, and that that is a very different thing.

At a later time, when there are more plates within reach, and a part, at least, of the text, it will be a pleasure to speak of these two works more in detail.

NOTE.

Mr. B. T. Batsford, the well-known London publisher of architectural works, is about to issue a book by Messrs. John Belcher and M. E. Macartney on Later Renaissance Architecture in England—a work that will be a sequel to Mr. Gotch's volumes.

Russell Sturgis.



Technical Department

$$Fe_2(OH)_6 = Fe_2O_3 + 3H_2O.$$

HERE we have the weak spot in the modern system of skeleton construction.

The architect and the engineer know it.

The owner and the layman know it too, for the architect and the engineer have not hesitated to take their clients into their confidence, in a direct or indirect manner. The "transactions" of learned societies are full of the subject.

For the past ten years, or nearly so long, the subject in relation to high buildings has received well-nigh continuous public attention. We haven't had experience long enough yet to determine, even approximately, the life of a steel-frame building. Some judges estimate it at thirty years, others less; but be the number what it may, it would be infinitely greater but for the deterioration involved in the formula at the head of this page. The architect can calculate the strains and stresses to which his building will be subjected, but here is an element of final uncertainty which threatens the stability of every column and every beam he employs.

In the plain vernacular our heading means RUST.

As old as iron, of course. It has bothered iron-workers ever since the metal was used. It is the only weakness in the material which, with its derivatives, is the most reliable and useful we possess.

Engineers know that the slow corrosive influence of the atmosphere is the most common cause of failure of bridges; and in the modern "skyscraper," RUST has become a subject for the gravest and most serious consideration, for it forms an insidious and permanent attack upon the chief constructive element in the modern building.

Naturally, in an age of investigation like this, a matter of so much importance has been made the subject of close and careful study. The result is that many old ideas about rust and its preventatives have been exploded. It has been shown, for instance, that neither water in itself, nor oxygen in itself, are rust-forming elements. Iron enclosed in oxygen will not deteriorate. Iron immersed in water, freed from air by boiling will not suffer even after years of submersion.

It is the combination of oxygen and water that does the damage.

So, anything that excludes the action of one, or the other, or both affords a perfect protection.

The most common method of protecting iron is and has been by the use of paint.

The common idea of paint is rather vague and inaccurate. The notion that is uppermost is that of a coloring material applied to the surface of things. The pigment is what strikes the eye, and so seems to be the main matter, whereas the color, stain or dye is really the least essential part save as it has an aesthetic value. In the question of preservation,—the utility of paint—it is of no account. Hitherto in the protection of iron a mixture of boiled linseed oil with some finely pulverized solid body has been chiefly relied upon as a defense against rust; and, curiously, the most common of all the pigments or solid substances used in the composition, has been oxide of iron—more or less pure—which is, in a rough sense, iron rust itself. Unquestionably, the composition is of some value as a protective coating, but experience and experiment have both alike demonstrated that its reliability intrinsically as well as practically (due to defects of manufacture and application) have been seriously over-rated. Both the linseed oil and the pigment mixed with it are imperfect protectives.

In the light of the best knowledge

we possess to-day it is questionable whether any architect is warranted in adhering to the old-fashioned article. Science has undoubtedly provided something immeasurably more reliable than oil which deteriorates, and in the mere process of hardening leaves the film full of minute pores, and a pigment which in itself is not only no protection but is a positive aid in the formation of rust.

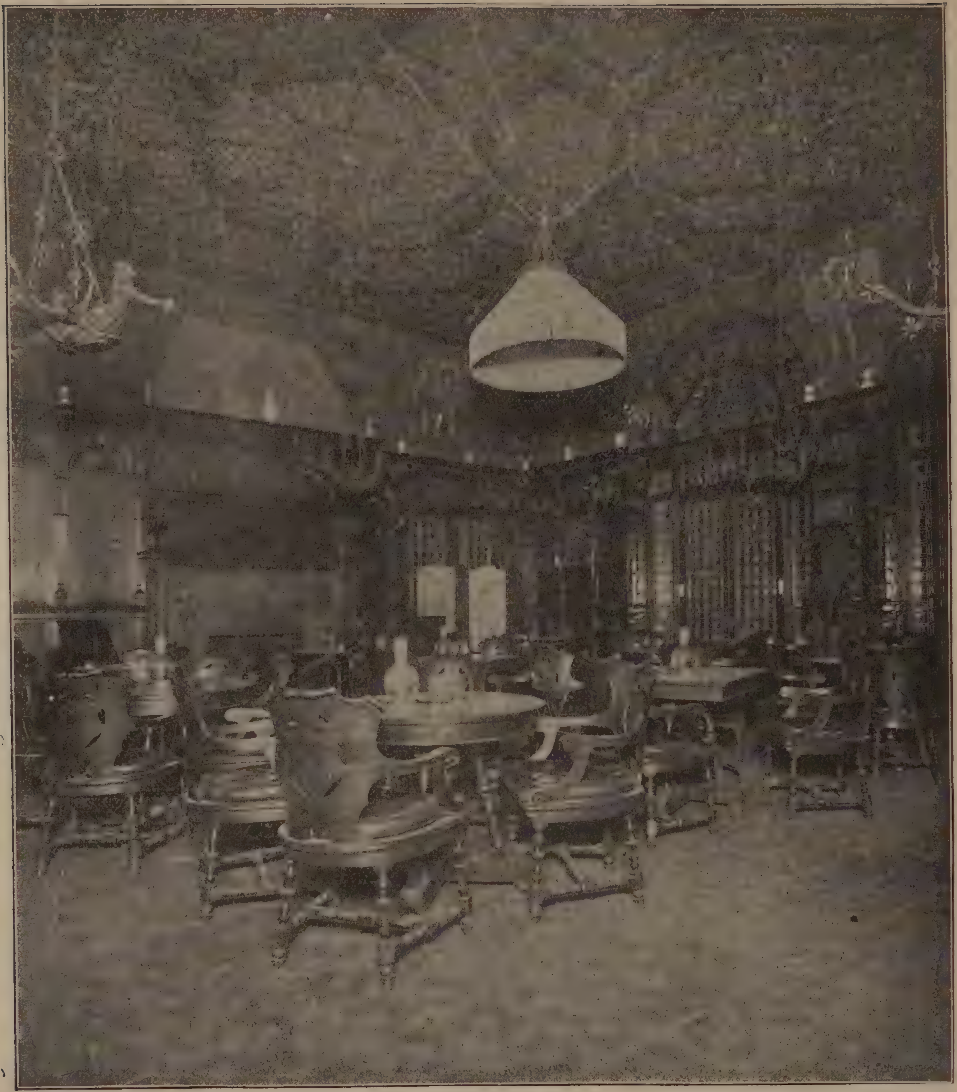
Ideally, the best coating would be one which, like varnish, for instance, excludes the air completely, does not deteriorate under the action of the atmosphere, and when applied is of hardness and tenacity sufficient to withstand the necessary usage. Here it is not a matter of pigment or coloring that we are concerned with. The object desired is a permanent and perfect coating of a nature, price, and so forth, to meet commercial requirements.

A great many attempts have been made to provide an article of this character. Many of the products produced, while possessing undoubted qualities, have, at the same time, very serious, and for iron as placed in our modern office buildings, radical defects. Edward Smith & Co., however, have succeeded in putting upon the market a new article, the unqualified success of which is universally acknowledged by architects and engineers who are employing it freely. It is known as Edward Smith & Co.'s "Durable Metal Coating," but it is to be remembered that it is entirely free from pigment and is really a varnish. It is, of course, a special product, suggested by the long experience of this firm, who are the oldest varnish makers in America, having been continuously in business since 1827. This company maintain the best laboratory and experiment station in the country.

Their Durable Metal Coating, then, is a slow-drying varnish. It is applied exactly as common paint is. It flows easily. It is not affected even by violent rain. The last gallon drawn from a barrel is exactly the same as the first. It does not run when exposed to heat, but becomes harder, and if heated to 250 degrees F. becomes a hard, tough enamel. It makes a very handsome coating when applied to iron—one of the handsomest we have—but it can be colored, if necessary, by painting upon it with any good linseed paint.

This new "paint" has been used with great success throughout the country by our leading architects. It was used, for instance, on the Minnesota State Capitol, designed by Cass Gilbert, St. Paul, Minn., and on the Brazier Building by the same architect at Boston, Mass. There is no need to specify a long list, but it is interesting to note that the paint was used in the following important edifices, designed by Messrs. Cady, Berg & See, whose works are illustrated in this number: The American Museum of Natural History, N. Y. City; The Journeay Building; Home for Aged Couples, 112th street and Amsterdam avenue, New York City; The Yale Dormitory, New Haven, Conn.; The Skin and Cancer Hospital, New York City; The Phoenix Mutual Life Insurance Co., and The Hartford Fire Insurance Co., at Hartford, and in other important buildings erected by this firm of architects. Also the office building, 37, 39 and 41 East 18th street, New York City, M. C. Merritt, architect; The Young Women's Christian Association Building, 124th street, near Lenox avenue, New York City, W. W. Knowles, architect. And the following important bridges: Eagle Bridge, Delaware & Hudson Canal Co., at Eagle Bridge, N. Y.; several bridges on the Duluth & Iron Range Railway., R. Angst, Chief Engineer; several in St. Paul, Minn., L. W. Rundlett, City Engineer. Also the Arthur Kill Bridge, from Staten Island to New Jersey.

The preservation of iron is an important matter for the architect, and one of the first and best steps that he can take to put himself abreast of the times is to investigate the "Durable Metal Coating" just referred to. Edward Smith & Co., 45 Broadway, will willingly give any needed information.



CAFE, HOTEL WALDORF. Henry J. Hardenbergh, Architect.

BOSTON PUBLIC LIBRARY

Setting, pointing and backing Lime Stone, Granite and Marble with "LaFarge" Cement will prevent discoloration. It is the finest ground and strongest Portland Cement manufactured. It has been used with success for preventing discoloration in brick construction. "LaFarge" is the best cement to use for all purposes and especially for the finer uses, ornamental work, artificial stone, statuary, mouldings, interior and exterior stucco work, etc. Pamphlet on application.

Wrought Iron Grille designed by McKim, Mead & White, Architects.

JNO. WILLIAMS. JOS. MITCHELL. JAS. WILLIAMS.

JNO. WILLIAMS,

MANUFACTURER OF

BRASS, BRONZE AND WROUGHT IRON WORK,

TO SPECIAL DESIGN ONLY

WROUGHT IRON DEPARTMENT.
H. B. STILLMAN, ASSOCIATE.

544 TO 556 WEST 27TH STREET.
NEW YORK.

Counter Screen in the Bowery Savings Bank, New York City.
Designed by McKim, Mead & White, Architects.

ESTABLISHED 1873.

"BROOKLYN BRIDGE BRAND"

ROSENDALE HYDRAULIC CEMENT.

NEW YORK AND ROSENDALE CEMENT COMPANY
ROSENDALE
HYDRAULIC
CEMENT
TRADE MARK
OVER 100,000 BBLS OF OUR CEMENT USED ON THE NEW YORK AND BROOKLYN BRIDGE
OFFICE:
280 BROADWAY
ROOM 61.
NEW YORK.

Fac-simile of barrel and label.

Specified and used by the leading Architects, Engineers and Builders

This cement is absolutely hydraulic, dark, finely ground, uniform; stands the highest tests, and will take more sand than any Rosendale hydraulic cement. Especially adapted for heavy masonry, sewers and concrete work. Net weight 300 lbs. per barrel.

Used in constructing nearly every prominent building and structure in New York and vicinity, on account of superior quality.

ALSO THE FOLLOWING BRIDGES:

NEW YORK AND BROOKLYN BRIDGE,
WASHINGTON BRIDGE, HARLEM RIVER,
EIGHTH AVENUE BRIDGE, HARLEM RIVER.
MADISON AVE. BRIDGE, HARLEM RIVER.
SECOND AVENUE BRIDGE, HARLEM RIVER.
MONONGAHELA BRIDGE, PITTSBURGH, PA.

SPECIFIED AND BEING USED ON

AMERICAN MUSEUM OF NATURAL HISTORY,
ASTORIA HOTEL—THE LARGEST IN THE WORLD,
WASHINGTON LIFE INSURANCE BUILDING,
COLUMBIA COLLEGE NEW BUILDINGS,
NEW PARK ROW OFFICE BUILDING—THIRTY STORIES,
NEW YORK UNIVERSITY BUILDINGS,
ASTOR'S NEW EXCHANGE COURT BUILDING,
NEW YORK ATHLETIC CLUB BUILDING.

USED BY THE FOLLOWING COMPANIES:

N. Y. CENTRAL AND HUDSON RIVER R. R. CO.,
CENTRAL RAILROAD CO. OF NEW JERSEY,
ROME, WATERTOWN AND OGDENSBURG R. R. CO.,
BOSTON AND ALBANY R. R. CO..
AMERICAN SUGAR REFINING CO.,
BROOKLYN ELEVATED R. R. CO.,
WEST SHORE R. R. CO.,
BROOKLYN CITY R. R. CO.

USED BY THE UNITED STATES GOVERNMENT

AT FORT MONROE, VA., FORT WASHINGTON, MD., FORT PREBLE, PORTLAND, ME., FORT MORGAN, MOBILE, ALA., FORT WADSWORTH, AND AT PLATTSBURGH, NEW YORK.

Adopted for Construction of all School Buildings in New York City and Brooklyn.

To the Architect . . . .
. . . Builder and Owner

Before deciding upon your interior finish, consider the advantages of **MAHOGANY**— Beauty, Improvement with age; Increased value to property; bearing in mind the extra cost is only in the raw material. The **LABOR** —a large part of the cost, is the same in either case.

WM. E. UPTEGROVE & BRO.,

MAHOGANY MILLS,
Foot East 10th & 11th Sts.
NEW YORK

RED CEDAR for lining Closets, etc.

ALL KINDS OF
VENEERS AND CABINET WOODS.

DYCKERHOFF PORTLAND CEMENT

Is recognized as the highest standard for excellence. Being of absolutely correct chemical composition and manufactured with the greatest care, it is of uniform and never-varying quality. All work in which it is employed will increase in strength with age and will be durable Other cements which may be represented as

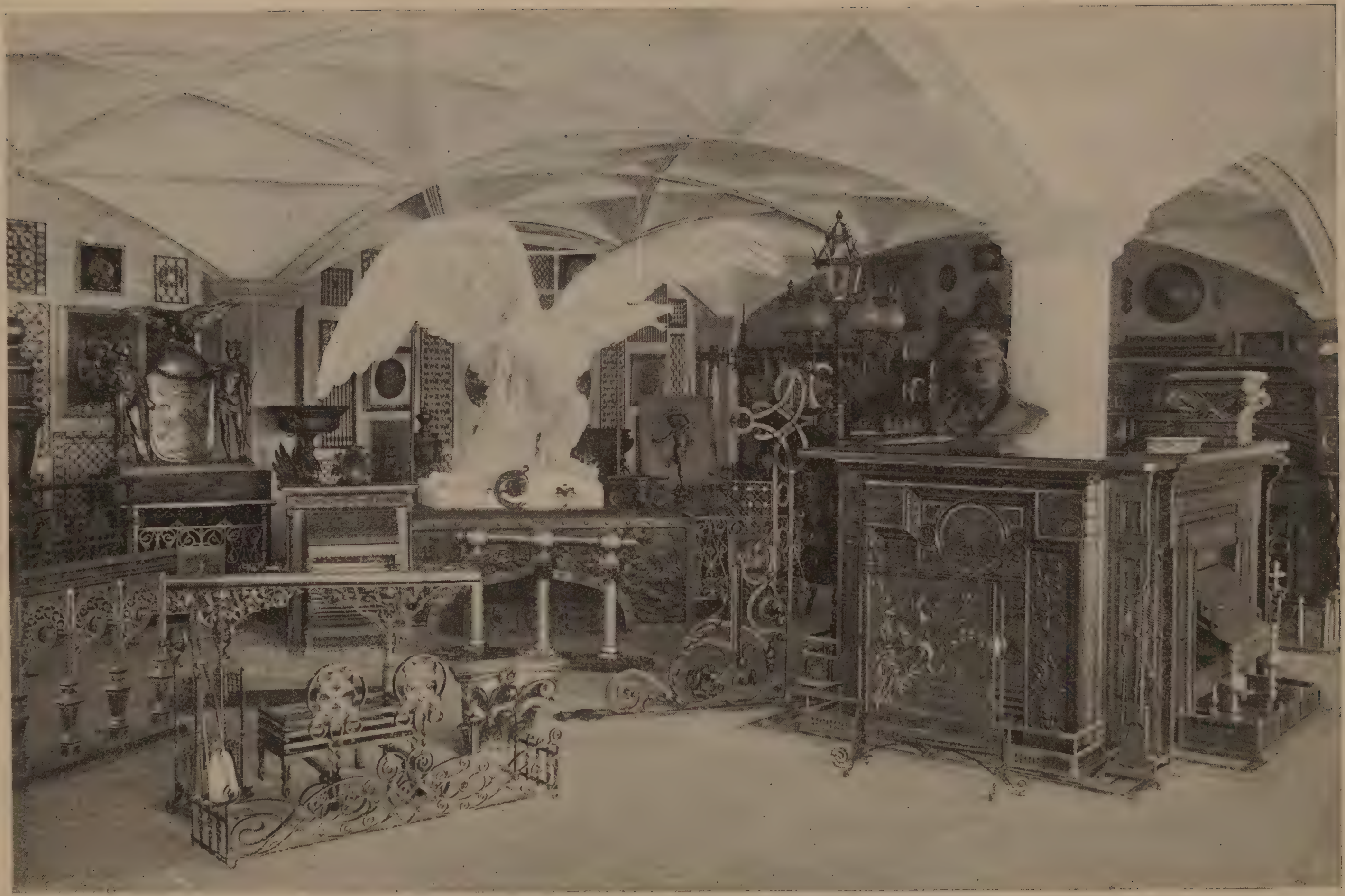
"JUST AS GOOD AS DYCKERHOFF,"

may produce a high tensile strength at a short time, but often expand or contract in volume resulting in the disintegration of the work in which they may have been employed. Such cements are of imperfect composition or manufacture, but they are sold at a lower price.

Pamphlet, containing directions for testing and for the employment of Portland Cement, together with testimonials, will be mailed free on application.

E. THIELE, 78 William Street,
NEW YORK,
SOLE AGENT, UNITED STATES.

BOSTON PUBLIC LIBRAR



OFFICE, NORTH 11TH AND BERRY STS **HECLA ARCHITECTURAL BRONZE AND IRON WORKS.** BROOKLYN, N. Y.

LEADING

ARCHITECTS

SPECIFY

The F. O. Norton Cement

PROMINENT

ENGINEERS

RECOMMEND

C. C. MARTIN,
Chief Engineer, New York and Brooklyn Bridge says: "The entire weight of the towers rests upon it."

WILLIAM LAMB. **THOMAS LAMB.**

W. & T. LAMB,

Mason....

Builders,

102 & 104 FULTON STREET, NEW YORK.
218 RODNEY STREET, BROOKLYN.
182 KEAP STREET, BROOKLYN.

...REFERENCES...

HOME FOR AGED COUPLES, ... New York.
CADY, BERG & SEE, Architects.

GARFIELD BUILDING, ... Brooklyn.
CADY, BERG & SEE, Architects.

PILGRIM CHAPEL, ... Brooklyn.
CADY, BERG & SEE, Architects.

LUTHERAN CHURCH, ... Brooklyn.
CADY, BERG & SEE, Architects.

RESIDENCE, LUSK, Esq., ... Brooklyn.
CADY, BERG & SEE, Architects.

RESIDENCE, GRACIE KING, Esq., Weehawken Heights.
CADY, BERG & SEE, Architects.

DIXON'S SILICA GRAPHITE ROOF PAINT

A PROTECTIVE PAINT
THAT HAS STOOD THE
TEST FOR MORE THAN
A QUARTER CENTURY

For Metal or Shingle Roofs and Iron Structural Work it is absolutely without an equal..........

Tin Roofs well painted have not required repainting for ten to fifteen years.

If you need any Paint it will pay you to send for circular

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

FRED H. SAMMIS,

And Manufacturer of MOSAIC TILE.

Contractor in Marble

FOREIGN and DOMESTIC.

Office, 159 La Salle Street, Chicago, Ill.

TELEPHONE, MAIN 2324.

FACTORY, ELGIN, ILL.

...REFERENCES...

Produce Exchange, N. Y.
St. John's College, Brooklyn, N. Y.
Edison Illuminating Co., Brooklyn, N. Y.
Edison Illuminating Co., Paterson, N. J.
Carter Building, Boston, Mass.
Dartmouth Club, New Bedford, Mass.
Tremont Temple, Boston, Mass.
Club House, Saratoga, N. Y.
Carnegie Library Bldg., Braddock, Pa.
Monmouth Court House, Monmouth, Ills.
State Building, Geneva, Ills.
Chicago Historical Art Building.
Continental Hotel, Chicago.
Chicago Telephone Co., Chicago.
Julian Hotel, Dubuque, Iowa.
Chamber of Commerce, Detroit, Mich.
Mathew Laflin Building, Chicago.
Home Savings Bank, Elgin, Ills.
Court House, Rochester, Ind.
Court House, Sparta, Wis.
Commercial Hotel, Muscatine, Iowa.
Illinois Trust and Savings Bank, Chicago.
Knoxville Court House, Knoxville, Iowa
Westinghouse Building, Pittsburg, Pa.
Central Union Telephone Co. Bldg., Toledo, Ohio.

· TIFFANY · GLASS · & · DECORATING · COMPANY ·
· FVRNISHERS · & · GLASS · WORKERS · DOMESTIC · & · ECCLESIASTICAL ·
DECORATIONS · · MEMORIALS ·
· 333 · TO · 341 · FOVRTH · AVENVE · NEW · YORK ··

HITCHINGS & CO.
ESTABLISHED FIFTY YEARS.
Horticultural Architects and Builders
AND LARGEST MANUFACTURERS OF
REENHOUSE HEATING AND VENTILATING APPARATUS.

The Highest Awards received at the World's Fair for Horticultural Architecture, Greenhouse Construction and Heating Apparatus.

Conservatories, Greenhouses, Palm Houses, etc., erected complete, with our patent Iron Frame Construction.

Send four cents postage for illustrated catalogues.

233 MERCER ST., NEW YORK.

NEW YORK ELECTRIC
EQUIPMENT COMPANY

S. BERGMANN, President.

OFFICES AND WORKS:
Cor. Thirty-third Street and First Ave.
Telephones, 129–38th and 1567–38th Street.

MAKE A SPECIALTY OF CARRYING OUT THE SPECIFICATIONS OF ARCHITECTS AND ELECTRICAL ENGINEERS FOR ALL ELECTRICAL WORK, THOROUGHLY AND CORRECTLY, AND WITH A COMPETENT AND THOROUGHLY EQUIPPED ESTIMATING DEPARTMENT, FURNISHES ESTIMATES WITH THE GREATEST PROMPTNESS AND ACCURACY. REFERENCES: ALL LEADING ARCHITECTS AND ELECTRICAL ENGINEERS. . . . .

BATTERSON & EISELE,

Mosaic Workers.

ROMAN AND VENETIAN MOSAIC FOR FLOORS, WALLS, MANTELS, &c.
RICH OR PLAIN DESIGNS.

IMPORTERS AND WORKERS OF

MARBLE, ONYX AND GRANITE.

Office: 431 Eleventh Avenue, bet. 35th and 36th Streets.

Steam Mill and Works: 425-433 Eleventh Avenue.

NEW YORK CITY.

Reference:
COOPER, HEWITT & CO.,
17 Burling Slip, N. Y.

SAVES METAL WORK. **REDUCES LOAD ON FOUNDATIONS.**

METROPOLITAN FIRE PROOFING CO.

New York Office:
874 Broadway.

TRENTON, N. J.

Boston Office.
166 Devonshire St.

Edward Cooper, Pres't, Edwin F. Bedell, Sec'y, New York.
Charles E. Hewitt, Treas., Joseph Stokes, Sup't., Trenton.

NEW JERSEY STEEL & IRON CO.

TRENTON, N. J.

COOPER, HEWITT & CO.,

17 BURLING SLIP, NEW YORK.

IRON AND STEEL

BEAMS, GIRDERS, ETC.

ENGINEERS AND MANUFACTURERS OF
AND CONTRACTORS FOR

BUILDINGS, ROOFS, BRIDGES

AND OTHER IRON AND STEEL STRUCTURES.

Plans and Estimates Furnished.

STAMPED STEEL CEILINGS

Decorative, Durable and Best

for Dwellings, Churches or Business Houses. Ceilings of any shape, old or new. Send for Catalogue.

H. S. NORTHROP, No. 42 Cherry St., N. Y.

BOSTON OFFICE,
No. 4 LIBERTY SQUARE, Cor. Water St.

MERCHANT'S
Metal Spanish Tiles.

COPPER, TIN (painted),
GALVANIZED STEEL.

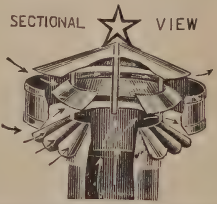
The most ornamental roof in metal. Storm proof. Easily laid.

Also, "GOTHIC" TIN SHINGLES.

The "STAR" Ventilator

Largest area. Storm proof and Durable.

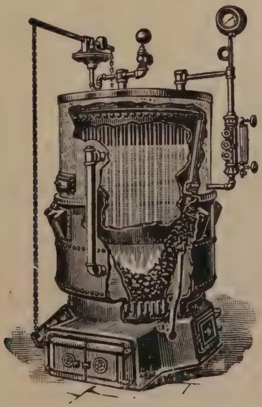
Made of
Galvanized Iron
Copper or Brass.



Our illustrated book mailed free. Correspondence solicited.

Philadelphia, New York. **MERCHANT & CO.. Incorporated,** Brooklyn, Chicago.
SOLE MANUFACTURERS.

THE "GORTON SIDE-FEED" BOILERS



Have advantages over any other heating boiler on the market.

YOU WANT THE BEST. WE HAVE IT.

Investigate for Yourself.

We will send further information on application.

GORTON & LIDGERWOOD CO.

96 Liberty Street, New York.

Old Colony Building, Chicago.
203 Congress Street, Boston.

THE CUTLER PATENT MAILING SYSTEM,

or U. S. MAIL CHUTE,

IS a necessity in office buildings and hotels. It is in use in one thousand buildings in the United States. ☘ ☘ ☘ Elevators made high buildings possible: the Cutler Patent Mailing System enables the Post Office Department to collect their mail. ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘ ☘

For information and estimates address,

THE CUTLER MFG. COMPANY,

General Offices, Cutler Building, ROCHESTER, N. Y.

ESTABLISHED 1868

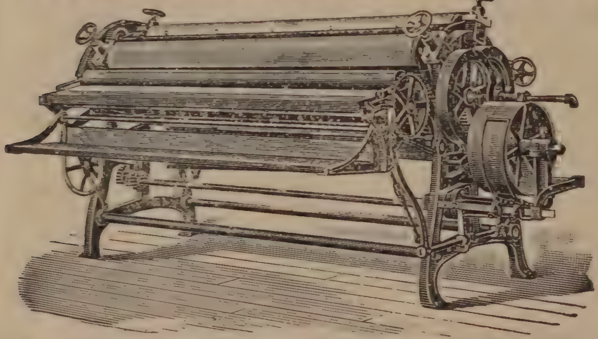
HAYES

SKYLIGHTS (METALLIC) LATHING &c

71-8TH AVE. NEW YORK.

FIRE-PROOF CONSTRUCTION

TROY LAUNDRY MACHINERY CO. (Lim)



COMPLETE OUTFITS FOR

HOTELS

INSTITUTIONS

Our line of Laundry Machinery has all the latest improvements, and is the best for laundering all kinds of goods.

FACTORIES:

648-650 Fulton St., Troy, N. Y.
395 to 401 Fifth Ave., Chicago.

SALESROOMS:

15 Warren St., New York City.
581 Mission St., San Francisco.

Catalogue S.

Telephone,
466 38th St.

157 E. 44th St.
New York.

Modeling. **G. E. WALTER.** Ornamental Plastering.

SECURE BANK VAULTS.

GENUINE WELDED CHROME STEEL AND IRON

Round and Flat Bars and Five-Ply Plates and Angles for SAFES, VAULTS, ETC.

Cannot be Sawed, Cut or Drilled, and positively Burglar Proof.

CHROME STEEL WORKS, Kent Avenue, Keap and Hooper Streets, Brooklyn, N. Y.

SOLE MANUFACTURERS IN THE UNITED STATES.

Established 1861.

OAKLEY & KEATING,

40 Cortlandt Street, New York City.

LAUNDRY MACHINERY. **HOTEL and INSTITUTION WORK a SPECIALTY.**

	Architects.
St. Joseph's Seminary, Dunwoodie, N. Y.	Schickel & Ditmars.
Seton Hospital, New York City.	Schickel & Ditmars.
Metropolitan Club, New York City.	McKim, Mead & White.
Plaza Hotel, New York City.	McKim, Mead & White.
The Dakota, New York City.	Henry J. Hardenbergh.
Delmonico's, Beaver St., New York City.	James Brown Lord.
N. Y. Catholic Protectory, Westchester, N. Y.	Wm. H. Hume & Son.
Hotel Normandie, New York City.	Wm. H. Hume & Son.
Montifiore Home, New York City.	Buchman & Deisler.
Halcyon Hall, Millbrook, N. Y.,	James E. Ware.
Inst. of Mercy, Tarrytown, N. Y.,	Geo. H. Streeton.
St. Benedict's Home, Rye, N. Y.,	Little & O'Connor.
Hebrew Sheltering Guardian Society,	John H. Duncan.

GOLD MEDAL AWARD, LONDON, 1887.

Chas. R. Yandell & Co.,

140 FIFTH AVE., NEW YORK.

DECORATIVE
LEATHERS IN THE SPANISH, FLEMISH, FLORENTINE AND VENETIAN STYLES.

DECORATIVE PAINTERS, COLOR SCHEMES SUBMITTED ON REQUEST.
SPECIAL FURNITURE.

Leather Wall Hangings and Screens a Specialty.

Send for large new catalogue (B.)

The Morse Universal Drawing Table

Has these Points of Merit:

1st. A spring to counterbalance the top, which makes it the easiest and quickest to adjust.
2nd. The top can be placed at any height from 30 to 42 inches.
3rd. The top will revolve, or when desired can be firmly clamped.
4th. The top can be placed at any angle.
5th. The adjustments are made to fix with compound clamps.
6th. The legs being under the centre of the top present no obstacles for the feet.
7th. When not in use it can be folded, requiring little space.

Manufacturers of a Complete Line of Draughting Room Furniture

THE MORSE MACHINE CO., Rochester, N. Y.

FLOORS

WOOD MOSAIC CO.,

Works at Rochester, N. Y.

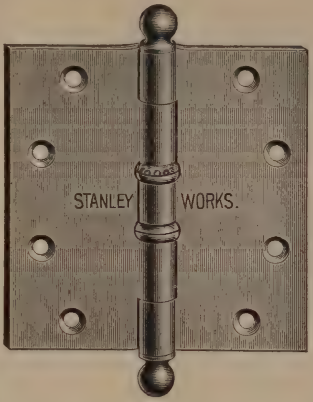
NEW YORK:
315 FIFTH AVENUE.
CHICAGO:
157 WABASH AVENUE.
BOSTON:
80 DEVONSHIRE ST.

Send for
Catalogue,
Prices, etc.

Hardwood Floors of Every Approved Kind.
Weighted Brushes and Prepared Wax,
End-Wood Mosaic, Parquetry,
Wood - Carpet.

STANLEY'S

Ball Bearing,
Steel............ **BUTTS**



Cannot
Wear
Down.

Require
No
Oiling.

Artistic booklet on application.

THE STANLEY WORKS,

New Britain, Conn.
79 Chambers St., New York.

Every Architect

should possess a collection of Architectural Photographs. Begin with the Great French National Monuments. Three thousand subjects, 10x14 inches; 60 cents each, for 50 cents each by the dozen. A small order from time to time is suggested.

The Architectural Record,

UNITED STATES AGENTS. **14-16 Vesey Street, New York City.**

Higgins' American Drawing Inks (Blacks and Colors)

The Standard Liquid Drawing Inks of the World.

OF THE BLACK INK

Jo. Pennell says: "There is no ink equal to it for half a dozen reasons. From the time you open the bottle until you put all its contents on paper you have no reason to find fault with it."

A. B. Frost says: "I use a great deal of it, and it is certainly the best."

AT ALL DEALERS.

By mail, prepaid, 35 cents a bottle; color card showing actual inks sent free.)

Higgins' Drawing Board and Library Mucilage.

A novel semi-fluid adhesive of great strength and body, specially prepared for sticking paper to the drawing board, repairing and labeling books, or any similar work requiring a quick-acting and powerful adhesive. Not a starch or flour paste, but a Vegetable Glue, the result of a new chemical discovery. Warranted to keep perfectly good for any length of time, and to contain no injurious ingredients. Excellent for mounting drawings, maps or pictures on cloth, paper or wood, and for repairing and labeling books, etc. May be greatly diluted for use as ordinary mucilage.

AT ALL DEALERS.

(3 ounce jar, prepaid by mail for 30 cents.)

CHAS. M. HIGGINS & CO. Mfrs.,
168 8th St., Brooklyn, N. Y.
London Office, 106 Charing Cross Road.

ESTABLISHED 1850

THE THATCHER FURNACES AND RANGES STEAM AND HOT WATER HEATERS.

ARE USED EXTENSIVELY BY THE BEST FAMILIES AND REAL ESTATE OWNERS IN NEW YORK AND VICINITY. THEY ARE REPLACING OTHER MAKES IN MANY INSTANCES. THEY ARE USED BY PROMINENT ARCHITECTS, ESPECIALLY FOR HIGH-CLASS WORK GUARANTEED. SEND FOR CATALOGUE.

THE THATCHER FURNACE CO.,
240 WATER STREET.

MANUFACTURERS OF

Furnaces, Ranges and Steam and Hot Water Heaters.

· ARNOLD · & · LOCKE ·

GLASS + STAINERS
AND + DECORATORS

OFFICE · SHOW · ROOMS · AND · FACTORY

Nos. 250 and 252 Fulton Street
(OVINGTON BUILDING)

· BROOKLYN · N · Y ·

EDWARD S. ARNOLD ALEX. S. LOCKE EDWARD TIDDEN

BUILDING AND ENGINEERING INFORMATION

CONSULT US

When about to place contracts for any class of Construction, or for Materials, Apparatus, and Appliances used in the Construction, Furnishing, and Equipment of Modern Buildings and Engineering Projects.

CAREFUL BUYERS

can obtain definite knowledge of what the Leading Manufacturers have to offer, and a reasonable comparison of prices, as we are employed by a large number of Representative Firms to collect and supply information concerning Building and Engineering Enterprises proposed or in progress.

OUR SERVICES WILL
COST YOU NOTHING.

◆

THE F. W. DODGE CO.

BOSTON.
146 Franklin St.

NEW YORK.
310 Sixth Ave.

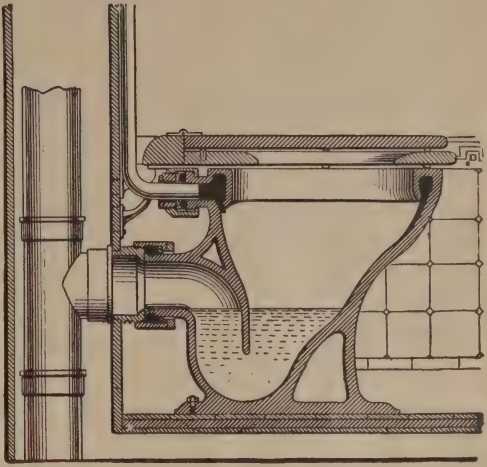
PHILADELPHIA.
447 Bourse Bldg.

CHICAGO.
Stock Exchange Bldg.

"Quaker City" Hopper.

HOSPITALS, School Houses, Railroad Stations and Public Institutions should be furnished with water-closets that have a large area of water, can be readily cleaned out in case the bowl becomes filled with foreign matter, and can be thoroughly flushed out.

The "Quaker City" Hopper possesses these advantages. It is an all Earthenware Closet, with the Trap and Bowl in one piece, holding a considerable body of water, and with a seal of greater depth than is found in an ordinary closet. There is a full-sized waterway from the Bowl to the Soil-Pipe, so that a stoppage in the Trap is impossible. The illustration shows the Closet connected with a Soil-Pipe fitting in the wall, but connection can be made with Soil-Pipe in the floor when desired.



HAINES, JONES & CADBURY CO.

Manufacturers
High Class Plumbing Goods.

1136 Ridge Ave.,
Philadelphia.

Send for catalogues, and, if possible, visit our showrooms.

HOUSES AT KENNEBUNKPORT.
Wm. Ralph Emerson, Architect, Boston, Mass.

DEXTER BROTHERS'

English Shingle Stains.

THE fact that our Stains do not turn black or wash off have given them the first place in Shingle Stains in the country. They are used by the best architects on the best houses. Send for sample boards to

DEXTER BROTHERS
Sole Manufacturers,

55-57 BROAD ST.,
BOSTON, MASS.

"HOFFMAN"

ROSENDALE CEMENT

YEARLY CAPACITY OVER ONE AND ONE-HALF MILLION BARRELS. LARGELY USED IN GOVERNMENT ARSENALS AND FORTIFICATIONS AND RAILROAD WORK.

Mills and Quarries Located in
Ulster County, New York.

BUSINESS ESTABLISHED 1832.

LAWRENCE CEMENT COMPANY,

(ORGANIZED 1853.)

SALES OFFICE, No. 1 BROADWAY, NEW YORK CITY.

Descriptive pamphlet sent on application.

SHOE AND LEATHER BANK	Cady, Berg & See, Architects
MORGAN HALL, Williamstown, Mass.,	Cady, Berg & See, Architects
CONSTABLE BUILDING	Wm. Schickel & Co., Architects
RESIDENCE OF ISAAC STERN, ESQ.	Wm. Schickel & Co., Architects
NEW PARK ROW BUILDING	R. H. Robertson, Architect
RESIDENCE OF CHAS. T. YERKES, ESQ.	R. H. Robertson, Architect
NEW YORK SAVINGS BANK	R. H. Robertson, Architect
PRESBYTERIAN BUILDING	Rowe & Baker, Architects
UNITED CHARITIES BUILDING	Robertson, Rowe & Baker, Architects
CABLE BUILDING	McKim, Mead & White, Architects
RESIDENCE OF HON. LEVI P. MORTON	McKim, Mead & White, Architects

B. A. WILLIAMS. G. N. WILLIAMS, JR.

B. A. & G. N. WILLIAMS, Jr.

Cut Stone Contractors,

Avenue A and 68th Street, - - New York.

NEW WALDORF HOTEL	Henry J. Hardenbergh, Architect
NEW MANHATTAN HOTEL	Henry J. Hardenbergh, Architect
NEW BAR ASSOCIATION BUILDING	Cyrus L. W. Eidlitz, Architect
CIVIL ENGINEERS BUILDING	Cyrus L. W. Eidlitz, Architec
HOTEL SAVOY	Ralph S. Townsend, Architect
CHAFFEE BUILDING	Ralph S. Townsend, Architect
FREE CHURCH OF ST. MARY THE VIRGIN	N. Le Brun & Son, Architects
NEW ALTMAN STORES	Kimball & Thompson, Architect
GILLENDER BUILDING	Berg & Clark, Archite
HOLLAND HOUSE	Geo. Edward Harding & Gooch, Archite
NEW KNICKERBOCKER THEATRE	J. B. McElfatrick & Son, Archi

JACKSON

Architectural Iron Works

OFFICE, 315 EAST 28TH STREET.

TELEPHONE, 2009-38th

BEAMS, GIRDERS, AND
ALL OTHER IRON AND STEEL SHAPES
FOR STRUCTURAL PURPOSES.

CAST IRON COLUMNS,
LINTELS AND STORE FRONTS.

ORNAMENTAL CASTINGS
FOR BRIDGES AND BUILDINGS.

ARTISTIC WROUGHT IRON GRILLES,
RAILINGS, AND ELEVATOR ENCLOSURES.

BRONZE AND BRASS BANK RAILINGS
AND GRILLES.

BRONZE PORTALS, GATES,
HINGES AND INSCRIPTION TABLETS,
FOR MAUSOLEUMS AND MEMORIALS.

FOUNDRIES AND SHOPS:

EAST 28TH AND EAST 29TH STS.
EAST 30TH AND EAST 31ST STS.

NEW YORK CITY.

PRINTED BY RECORD AND GUIDE PRESS 14-16 VESEY ST., N. Y.

BOSTON PUBLIC LIBRARY
3 9999 10238 023 3